JOHN BROWN.

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"PIONEERS OF THE PLANTING ENTERPRISE IN CEYLON."

(Second Series.)

JOHN BROWN,

ENGINEER AND PLANTER.

THE late Mr. John Brown was born at Udney, Aberdeenshire, on 17th October, 1826. He was educated as a Civil Engineer and served first on the staff of Mr. Gibbs of the Aberdeen Railway, and afterwards on the Railway Survey and Construction staff of Mr. John Miller of Edinburgh.

In the year 1848 he sailed for the East viâ the Cape to take up an appointment on an Indian Railway under Government. The vessel made a fast voyage, and on reaching Point-de-Galle, and finding that he had ample time, before his due date, Mr. Brown determined to visit Colombo and Kandy and see something of the Ceylon planting districts, before proceeding to India. This was probably very much owing to the fact that Mr. and Mrs. R. B. Tytler were passengers in the same vessel,—Mr. Tytler returning after having gone home to get married; and all he had to say about coffee in Ceylon no doubt influenced the young Engineer. Be that as it may, life and prospects in Ceylon proved so attractive, and there was such evident scope for the exercise of his own profession among the planters, that Mr. Brown determined to abandon his Indian engagement and to remain in the island. For some years Mr. Brown was very busy over engineering work in connection with the coffee enterprise, chiefly in Pussellawa. His first engagement was to undertake the planning and erection of extensive works for coffee preparation on Rothschild, the property of the Messrs. Worms, which he brought to a successful conclusion. Mr. Brown's next and his largest undertaking was in connection with the late Mr. R. B. Tytler's giant coffee irrigation scheme, commonly known as the Rajawella Waterworks. On this Mr. Brown was occupied for six years, and the large turbine and pumping machinery erected at the side of the Mahaweliganga, in Dumbara, were, finally, a complete engineering success. Water in large volume was forced up to the top of the hill on the property; but the difficulty in distributing it over a sufficient area of the planted coffee, prevented the scheme from turning out eventually, the financial success anticipated for it. As this was one of the most notable engineering works ever undertaken in connection with the coffee enterprise of Ceylon, or indeed with tropical planting anywhere in the world, we extract from several issues of the *Ceylon Observer* of the "fifties" and "sixties", accounts of the progress and opening of the Waterworks :—

IRRIGATION APPLIED TO COFFEE PLANTING.

SOME of our readers travelling by the Colombo and Kandy coach may have observed lately sundry carts along the road laden with massive iron pipes, about nine feet long and of diameters varying from six to ten inches. These pipes form part of the Machinery intended for raising water to irrigate the portion of the Rajawelle Estate belonging to Messrs. Morton and Tytler; and as considerable public interest and curiosity have been excited on the subject of these contemplated Water-works, we proceed to give some general account of them.

The Rajawelle Estate, situated in the lower Doombera valley, is known to lie within the line of country in which the S. W. Monsoon occasionally fails, and the result is that this Estate, which in moist seasons bears very heavy crops, loses in a very dry season from one-third to one-half of the crop on the trees. There are only two or three small streams in the property, and even these in very dry years occasionally cease to flow; but the Mahavilla Ganga forms the boundary of Rajawelle on the south-side, and as the Mahavilla affords at all seasons an abundant volume and fall of water, the idea occurred to the proprietors of the Estate, to make that river itself subservient to the purposes of irrigation. The problem practically was a serious and difficult one. The old Estate lies a mile and a half from the river in a straight line, and is divided from the new Estate by a ridge ascertained by actual survey to be 460 feet in vertical height. The power requisite for raising even a moderate quantity of water to this high elevation by a single lift, is very great; yet the necessity for employing a single lift could not be avoided except by substituting still more costly Machinery, such as a powerful Steam Engine half way up the hill. To this there were many practical objections. Accordingly it was resolved to throw up the whole quantity of water required, by means of the power obtainable from the river alone: and after consulting practical Engineers in England and Scotland, it was resolved to employ as the motive power *Whitelaw's Horizontal Water-wheel.* This Wheel, with the Pumps and connecting Machinery, has been accordingly manufactured by Messrs. Whitelaw at Glasgow, and the whole are on their way to Ceylon in the 'Coromandel.' The iron-piping (of the length of 6,250 feet and weighing 212) Tons intended for the conveyance of the water over the ridge was brought out by the 'Armais' some weeks ago; and we believe a great part has been forwarded to Rajawelle. The works at the latter place are in rapid progress, The great sluice, for supplying the water to the Wheel, is nearly cut. This sluice, which will be a small *Canal* when completed, is to be nearly three quarters of a mile in length, and eighteen feet broad by three feet deep,—discharging at least half a million of gallons of water per minute. As there are several rapids in this part of the Mahavilla Ganga (indicating of course a great declination in the bed of the river) a comparatively short extent of sluice gives a great fall;—consequently it is found that the three-quarters of a mile give a fall of some 24 feet. The large body of water supplied by this canal, with the fall of 24 feet, produces a very large amount of motive power; in fact it is calculated to be equal to a Steam Engine of about 200 Horse-power. We believe that a Steam Engine of this size would have cost more than the whole expense of the intended works,—independently of the objection that its working would have been very costly, whilst the Water-wheel is self-acting.

The Wheel will be quite a curiosity in its way. The Diameter is only 14 feet,—a size which would be considered small for any of the Water-wheels used on Coffee Estates for working Pulpers and Clerihew fans. We believe that the ordinary overshot Wheels used on Estates are about 16 feet in diameter; but the resulting power is seldom more than from 8 to 12 Horse-power, An overshot Wheel of 200 Horse-power, would require to be at least *sixty feet* in diameter; and a Wheel of such an unwieldy size would have required to be very favorably placed, as regards the supply of water and other circumstances, to be worked effectively. We remember seeing a sketch, in the *Illustrated News* last year, of a gigantic wheel of this description, lately erected at some Mines in Wales, but although the diameter was four or five times as great as that of the Rajawelle Water-wheel, the effective power was less. Mr. Whitelaw himself, in a letter published in the *Mechanic's Magazine* of May 6th 1854, speaking of this very Rajawelle Wheel, describes it as. "A Water-wheel of 200 Horse-power, which I am "making for Messrs. Gwynne & Co., Engineers, "London, which is to work six single-acting pumps "of 20 inches stroke and 8¾ inches diameter, to raise "water to a height of 460 feet for irrigating an "Estate. When finished I believe, *no water-wheel in "the world will be of greater power than this*; but be "this as it may, it will be a large one."

The principle of Whitelaw's Wheel is peculiar and not very generally known. It is placed horizontally, and as a central opening for the ingress of the water from the sluice, which is supplied by a large induction pipe. The diameter of the pipe for supplying the Rajawelle Wheel is 76 inches, so that *a tall man with his hat on might stand upright in it!* This pipe will be always full; and even persons practically unacquainted with Hydro-dynamics, can readily understand that an enormous force must be exerted by a perpetual column of water six feet four inches in diameter and twenty-two feet in vertical height. The principle of action is somewhat complex in theory, though extremely simple in practice and result. It has been described as "centrifugal"; and so it is to a certain extent. The arms of the Wheel are curved and have orifices at the extremities; and the water, forced in through the central opening, rushes through these curved arms and out of the orifices; and Mr. Whitelaw describes the action as communicated by the water pressing on the sides of the arms as it rushes through and by the centrifugal force as it rushes out. But as we observe from the drawing which has been sent to us, that the diamater of the central opening in the Wheel is very much less than the diameter of the large supply pipe, we fancy that the action is greatly aided by the operation of another: valuable hydro-dynamical principle, viz. *that a force exerted upon a certain surface of water is multiplied when communicated through the water to a smaller surface.* The increase is in a known ratio, viz. inversely as the squares of the surfaces. This is the principle of the hydraulic press. It was by the application of this principle that Mr. Robert Stephenson raised the vast tubes of the Britannia Bridge. On a small scale, the action of a common "syringe" is precisely the same; and this perhaps is the humblest illustration of the principle.

The Rajawella Wheel is to work three or more Pumps, which are upon the ordinary principle, and no further remarkable than for their size and strength. These pumps will deliver their water into the conduit or long iron piping laid over the ridge; and Messrs. Gwynne & Co. have guaranteed that the Machinery shall deliver 500 gallons of water per minute at the top of the ridge, which, as mentioned above is 460 feet in perpendicular height. To give an idea of the strength of the valves required in these pumps, it may be mentioned that the actual weight of the water in the conduit pipe when full, will be, in round numbers, over *seventy tons*; but as the pressure exerted by a column of water is proportionated only to its *vertical* height, the effective weight may be taken at one-tenth of that figure. A continual pressure however of even 7 or 8 tons upon pump-valves, calls for both stout material and good workmanship.

How much of the Rajawelle Estate can be watered efficiently by the amount of water above stated (500 gallons per minute) is a question which actual experiment alone can solve. Much difference of opinion exists on the subject. Some of Messrs. Tytler and Morton's friends are kind enough to assure them that the whole thing will be an utter failure! The Estate consists of 700 acres or thereabouts, of which 200 Acres (the old Estate) lie over the ridge, and 500 Acres (the new Estate) between the ridge and the river. Taking 600 trees to the acre on the old Estate, and 1,200 trees to the acre on the new the total number of trees may be set down at 720,000; and this happens to be exactly the number of gallons of water per 24 hours at the rate of 500 gallons per minute. In other words, if the whole Estate is to be watered at once, the quantity received by each tree would be only *one gallon* in the 24 hours; and this without allowing for loss by evaporation, &c. But we believe the intention is to water only 50 or 100 acres at a time; and it is calculated that in about a *month*, the greater part of the Estate would have received a supply equal to a heavy shower of rain. In 1853 the drought at Rajawelle lasted nearly

five months; and experience is said to have shown that it is only when the trees have been more than a month or so without any supply of moisture that they begin to suffer materially. In June and July 1853, in the height of the drought we learn that Mr. Tytler tried the experiment of leading a small stream of water among a few acres of the old Coffee, and that the experiment was perfectly successful, though the stream itself had dried up before the drought was quite over. The watered trees filled their cherries, just as in a moist year, while the unwatered trees in the adjoining squares had fully half their berries light. And with regard to the supply of water, it should be mentioned that Gwynne & Co.'s engagement is that the quantity guaranteed shall be delivered at *the top of the ridge.* The conduit piping has stop-cocks at various intervals, and as a much greater quantity of water can be delivered by the same power at lower levels, the greater part of the new Estate can be supplied far more abundantly than on the above calculation. However actual experience will be the best test; and we learn that the works are expected to be in actual operation before the end of the present year. Mr. John Brown, formerly in the service of Messrs. Worms, is the Engineer employed on the spot; and under his efficient supervision the works are proceeding rapidly and satisfactorily.

THE RAJAWELLA WATER WORKS.

We are rejoiced to hear that the great irrigation works at the Rajawella estate were successfully tested on Saturday the 7th instant, the water being forced to the top of the hill, some 460 feet above the level of the Mahavilla ganga. We hope the unwonted elevation will not *turn* the old River's *head.* We heartily congratulate those concerned on the successful completion of what has been an anxious and costly work, and a great experiment. Its successful issue is of great importance to the future of Ceylon.

Later on, however, some of the machinery first erected was found unsuitable, for in the *Observer*, January 1859, we find the following:—

THE RAJAWELLA IRRIGATION WORKS.

"*Immense Hydraulic Engine.*—Messrs. Abernethy have just finished, at their works at Ferryhill, Aberdeen, a hydraulic engine of very great power. It is intended for an East India plantation, and its object is to pump water, for purposes of irrigation, on both sides of a hill whose altitude is 500 feet. It consists of twelve pumps, which act in sets, and will be driven by a water-wheel of 200 horse-power. The engine is calculated to lift water at the rate of 1,000 gallons a-minute. It is of massive construction and admirably finished workmanship. We (Aberdeen Journal) are not aware that any hydraulic engine of nearly equal power has yet been constructed in this country."

We have no doubt this is the machinery for Rajawella now on its way round the Cape. Mr. Brown, the Engineer, (who went home mainly with reference to this machinery) is already in the Island.

THE RAJAWELLA IRRIGATION MACHINERY.

The great pumps—probably the most powerful in the world—intended to force up water to the highest point of the Rajawella property—have arrived at Colombo in the *Ellon Castle,* and with the connected pipes and machinery are being landed and sent on to their destination under the superintendence of Mr. Brown, the Engineer. Some idea of the pumps may be formed from the fact that there is a pressure of 8 tons on each piston. It is expected that they will send water up to a height of some 450 feet—the highest point, above the river, of the fine estate for which they are intended. For the sake of the continued and extended success of the Coffee enterprise in Ceylon, as well as out of regard for the spirited proprietors of the Rajawella property, we trust the experiment will be largely successful. The effects of full success can scarcely be estimated. On one estate it is calculated that in a year of drought it would make all the difference between an unremunerative gathering of light husky Coffee, and a bumper crop of full, bright, solid berries, yielding a profit of £10,000. For this year we are glad to hope that the Dumbara and many of the other lower estates are safe—long continued heat having been succeeded by copious showers of rain and occasionally hail—the latter being light and harmless. All that is wanted is moderate weather in June. By next year the great irrigation works will be in full play, placing, let us trust, the owners of the particular property beyond the reach of anxiety, and opening up a new era for Coffee Planting in Ceylon.

THE RAJAWELLA WATERWORKS.

It affords us much pleasure in announcing the final completion and success of this costly and spirited undertaking. By force-pumps of an ingenious construction, moved by a Turbine of 200 horse-power, water is raised along a pipe of a mile and a quarter in length, to a height of five hundred feet, sufficient in quantity to serve for the irrigation of eight hundred acres of Coffee. In the bold conception of the original idea, the patient perseverance in carrying it out, the overcoming of engineering difficulties as to the most suitable machinery and the erection of the ponderous pieces, and in the fortitude and faith which sunk thousand after thousand of pounds in an improved experiment, too much credit cannot be given to all parties concerned. It is an honor to the Island to have such a work to exhibit. We are assured there is no room any longer to doubt of its final success. The Pumps originally supplied by Gwynne & Co. were a failure, but another set, supplied by Abernethy & Co., of Aberdeen, work with a precision and ease comparable to clock work, and though the replacement cost £3,000, and the former contents of the pumping house lie a scattered heap of worthless iron, there is more than equivalent for all in the great fact that the property is independent of drought. The present season's very heavy crop is mature, and the beans that are picked are of well-filled quality, equal to the produce from any estate of the same elevation. The effect of the water applied in irrigation is plainly and immediately perceptible upon the drooping trees. They are kept fresh in aspect and the crop is sustained by circulation of the sap, which would stagnate in the absence of the moisture at the roots. It appears to us that the value of these works is not confined alone to the watering of the trees, most important though that view of their object be, but that in the carrying out of liquid manure, coupled with the digging of the soil, in such a warm district as Dumbara, not only would there be a saving of labor in manuring, but it would be impossible to predicate to what extent the quantity of produce might be increased.

Mr. Brown's skill and perseverance in overcoming the difficulties, incidental to so novel and trying an engineering enterprise, greatly impressed those who watched him. His quiet, resolute determination combined with great ability, carried him through where other men would have failed and established his reputation in Ceylon as a reliable, sagacious Engineer and a valuable colonist of the right type for a young plantation country.

The time had now come, indeed, for the young Engineer-planter, to begin planting on his own account, and accordingly Mr. Brown, who had now seen a good deal of the country, took up land for coffee planting in partnership and conjunction with Messrs. Norman Stewart and J. B. MacIntyre. Stewart, Brown and MacIntyre—as the partnership ran—opened and planted a group of estates in the Badulla district, the principal of which was known as Glen Alpine, and which, after yielding rich crops for several years, were sold in 1864 to a London Limited Company, entitled the Ouvah Coffee Company. This Company proved successful, and Mr. Brown was induced to join the Board as Managing Director. Under his care the Ouvah Coffee Company, as also the Spring Valley Coffee Company—in whose formation by the purchase of the famous Spring Valley Coffee plantation from Mr. Bannatyne, Mr. Brown had assisted—became very prosperous and paid large dividends for many years. To these was afterwards added the Hunasgeriya Estate Company; and in the year 1877, Mr. Brown and some friends started the Colombo Commercial Company, Ltd., which though intended mainly at first to act as Colombo Agents for the Coffee-growing Companies, has developed into an engineering and contracting as well as mercantile and planting concern of an importance far beyond Mr. Brown's original conception, thanks very much to the judicious management of this Colombo Company and to the impetus given by the prosperity of "tea"!

The latter portion of Mr. Brown's life was almost entirely devoted to the management of the several Companies, with which his name was identified, and the fact of his having successfully piloted them through the difficult times that followed the collapse of the coffee enterprise in the "eighties," and restored them to prosperity in tea, is sufficient evidence of the care and enterprise of his management. We believe that only one other Coffee Company succeeded in passing through the crisis brought about by the coffee fungus, *Hemileia vastatrix*, which practically ruined a great planting enterprise in Ceylon.

Mr. Brown had a decided faculty for invention, and, as a practical Engineer, he early found room for its application in a young planting colony just developing a new enterprise. He was responsible for many of the improvements made in Coffee-pulping machinery, his own Coffee Crusher and Pulper not being the least noticeable —and when attention passed from coffee to tea he introduced two more well-known machines in "the Desiccator"—a splendid tea-drying machine also used to prepare desiccated coconuts—and his "Triple Action Tea Roller." Both these machines have been warmly commended and have proved most successful, and considerably over 500 Desiccators were in use in Ceylon alone at the date of Mr. Brown's death. The Triple Action Tea Roller—highly praised for its work by planters best acquainted with it,—was unfortunate in being the cause of an action at law for infringement of patent taken by Mr. Wm. Jackson against Mr. Alfred Brown and the Colombo Commercial Company, the Agents for the machine. The case was carried to the Privy Council, when Mr. Jackson was unable to sustain his charge of infringement; but it must always be regretted that the Privy Council judgment was not pronounced until after Mr. John Brown's death.

Mr. Brown died from the result of an illness contracted in Ceylon in the early part of 1894. He left Colombo for England in poor health, accompanied by his eldest son, and contrary to all expectations he did not get benefit from the sea air, but gradually lost strength and died after reaching Alexandria, where he was landed from the steamer in order to secure experienced medical advice. He died at the Deaconesses' Hospital, and lies buried under an Aberdeen granite tomb in the Alexandria Cemetery:—

"Mr. J. Brown was born on 17th October 1826, married for the first time to Elizabeth Hall, 7th September 1858 and again to Elizabeth Wylie Abernethy on 18th June 1892. Died 18th March 1894. He left seven children, all by his first wife."

The subject of our Memoir cannot be described as having been a brilliant man; but the quality of his mind was solid and thoroughly practical. His success in life was mainly due to hard work, thoroughness and sincerity of purpose. Once having made up his mind as to the proper course to pursue—that so-and-so was the right thing to do or the right way to do it,—no one could turn him from his purpose, or persuade him to the contrary. In private life, Mr. Brown was most worthy. In respect of both the Coffee and Tea Planting Enterprises of Ceylon—in a connection extending over some 45 years—few men have left more practical or useful evidence of their presence than Mr. Brown. As an Engineer, an Inventor, a Proprietary Planter, a Managing Director, and Chairman of Companies, Mr. Brown took a prominent and successful position, and his name ought long to be remembered in the annals of the Planting, Engineering and Commercial development of Ceylon.

COFFEE IN PORTO RICO.—A New York exchange authority says:—"The Porto Rico coffee crop will, this season, according to advices received by leading merchants doing business with that island, fall short all of 66 2-3 per cent over the amount exported last season. This shortage will not in any way be felt in this market, as the importations are comparatively light from Porto Rico, their markets being those of France, Italy and England."

Agricultural Pests:

WITH METHODS OF PREVENTION.

BY MISS E. A. ORMEROD,

(LATE CONSULTING ENTOMOLOGIST TO THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND).

IV.

INJURIOUS MOTHS—METHODS OF PREVENTION.

In the case of the white cabbage butterflies, the caterpillars of which often do serious mischief in gardens, they have been found not to do so much harm in proportion to field cabbage, because the caterpillars choose a dry, well-sheltered place to change in. For this they crawl away from their food-plants, and hang themselves by a silken band under eaves, palings, or the like shelter, out of doors, or in any neglected corners in garden-sheds, where they are allowed accommodation, and much may be done to lessen amount of attack simply by tidiness. The collections of old brooms, bits of wood, and dry rubbish of every kind in which they shelter, are much better away, whether indoors or out; and a brush taken along angles and in corners and under stairs, ladders, beams, &c., in garden-sheds, will sometimes clear the chrysalids out by the handful. A search of this kind between the time of the first and second brood in summer, and some time between November and March, would do much good.

It is an excellent principle to keep down the effect of insect-attack by broad measures of agricultural treatment which will carry the plant well on away from the power of the insect; but at the same time it should not be forgotten that when there are a great number of large caterpillars or chrysalids plainly to be seen, and easily to be laid hold of—whether with fingers or by other means—the best thing to do is, forthwith, to lay hold of them.

There are not many kinds of butterfly caterpillars which are hurtful to crops in England; but amongst the hosts of different kinds of moth caterpillars that cause great loss, about the very largest of all, which is that of the death's head moth, is best got rid of by hand-picking. This sometimes does much harm to potatoes by feeding on the leafage.

The caterpillar usually hides by day, and feeds in the evening or at night; therefore, when great harm is found to be going on (either in this case or others like it) from an unseen enemy, it is well for some trustworthy person to watch at dusk or dawn for what is going forward, and with large creatures like these caterpillars a very small quantity of light will be enough to see them by as they gentley move the leafage in feeding. When full-fed the caterpillar goes down into the ground to change; therefore, turning up the chrysalids is an easy measure of prevention with this potato-feeder.

The various kinds of attacks of moth caterpillars are so many, and the injuries they cause so great, that in whatever point we may select now for study, it seems at the cost of leaving out something else of importance; but in these short details. I have tried to draw attention to some four or five principles of preventing or remedying attack:—

One is taking away shelter (as in the case of cabbage caterpillars). Another, the possibility of hand-picking, shaking down, gathering, or whatever term we use for it, being so managed as to be a practicable and paying operation, instead of a ridiculous loss of time. Another is prevention of egg-laying on fruit bushes, by keeping them so properly pruned that there is no attraction of cracks and crevices. We have also noticed that the caterpillars may be smoked or poisoned in their burrows—a simple piece of knowledge, but yet one which, some few years ago, would have been of great service in saving coffee shrubs in one of our colonies. Further, we have noticed that, with webbing caterpillars, it is dicidedly well, before we pay our visit, to see if the family are at home.

With the great increase of the fruit industry, we have now areas of thousands of trees where formerly these were counted by hundreds, and we have a consequent increase in amount of the attendant fruit-tree insect vermin. Where there is a large extent of plant growth of any kind, orchard trees or otherwise, affording food in their feeding condition, and shelter in their other stages, to special kinds of insects all the year round, and for successive years, there these insects are sure to be present. This has been the case in such a marked and increased degree during the past few years, and in some of our fruit-growing localities, as to necessitate the adoption of some special measures of prevention suitable to the special habits of some of the kinds of caterpillars, and also of remedial applications suitable for sweeping them all off and destroying them together (whatever their other habits may be), when broadscale ravage on the leafage calls for broadscale clearance.

One very important division of caterpillars to which measures of prevention can be applied, is that of the "looper" caterpillars of various kinds of moths, of which the females are either totally wingless, or the wings are abortive to such a degree as to prevent them being of service in flying. Of these, two of the most hurtful kinds are the mottled umber *(Hybernia defoliaria)*, and the too well-known winter moth, sometimes called the Evesham moth.

The method of life of both the above kinds is for the caterpillar to hatch in the spring, on the orchard trees on which the eggs have been laid, and feed on, or possibly fairly ravage, the leafage and all the soft growths, during a period which may be from about the end of March until the end of June. Then the caterpillars leave the trees, and go through the change to chrysalis state beneath them. This may be just about the surface of the ground, or a little below. From these the moths begin to come out in October or November, and the wingless female moths creep up the trees and deposit their eggs. This habit, if the moths only went up the trees during a special period, would put means of prevention at once in our hands. But even as it is, the infestation may be greatly reduced by putting bands of sticky material round the trunks, such as will either deter the moths from trying to go up, or hold them firm if they try to cross. This plan catches the moths by hundreds on each tree, but care must be taken lest the mixture applied should injure the bark. On the rugged, thick bark of old trees, where the out-side is a mere dry dead coating, it is possible that even tar may be applied without doing harm, though not without risk.

But with young trees there is very great danger of serious injury, and sometimes great losses have taken place consequent on tar or grease being applied direct to the bark. The application soaks into the tissues, and the tree in such case perishes.

The safest way is to begin by passing a band of tough grease-proof paper, such as may be procured at very small cost from grocers, round the tree. This may be about seven inches wide, but the wider the better; the ends should overlap, and the paper be secured in its place by a piece of string being tied round near the upper and lower edges. On this the grease may be smeared. A flat bit of wood, like a paper-knife, is a convenient implement for spreading it with, and common cart-grease answers well as a cheap and effective application. Even, however, where the tree is protected, some care must be exercised in the choice of the "sticky" mixture selected, as some of the materials sold under the name of "axle-grease" contain petroleum residue, animal grease, or other components, which, like tar, would have very undesirable effects if (as I have myself seen to happen) they should soak through the supposed grease-proof paper to the bark.

The above treatment does much good, but does not answer perfectly, for the following reason. Though the great body of these moths come out from the middle of October to December, this period by no means includes the whole appearance. We find them still at the end of January, and the later brood may be found coming up towards the end of winter; and at the end of March another kind of moth, with wingless females, namely, the *Anisopteryx æscularia*,

or March moth, which lays its eggs in bands embedded in down on the twigs, is (or very likely is) also present.

These various moths, including besides what may be called those of common habits, such, that is, as moths which come on the wing to the tree, and of which the caterpillars, after feeding, spin up on the bark, or in any convenient shelter, may be counteracted in some degree by measures based on knowledge of their habits. The webs of those that make nests may be cut off and destroyed with the caterpillars, or (in the case of the small ermine moth) the chrysalids, within them. Cocoons covered with eggs, as in the case of the common vapourer moth, may be searched for and destroyed; and, similarly, the rings of eggs of the March moth and of the lackey moth, which resemble them in being laid in a band on twigs, may be got rid of in some degree by careful search, and pruning off the infested twigs where they can be reached. But for the most part these and various other means of prevention or remedy have to be applied, not as broad measures of treatment, but as special measures for each special attack, involving necessarily special outlay. For these reasons, that is, the pressing need which has long been felt of having some kind of application at hand which is cheap and sure in its action, and which can be brought to bear at once, when required, on any or all sorts of moth-caterpillars together (whatever their various natures or previous histories may have been), and will kill the whole collection of ravaging hordes at once, without damaging the leafage, the experiments have been made, which have resulted, in some of our fruit-growing districts, in the successful introduction of the method of spraying caterpillar-infested leafage with Paris-green, which has long been found serviceabe in the United States and Canada.

Another very important division (taken agriculturally) is that of the surface caterpillars, so-called from their injurious operations being for the most part carried on near the surface of the ground.

The family of moths to which these belong is termed *Noctuidæ*, from the circumstance of many of them flying chiefly at night or in the dusk. The heart and dark moth, the caterpillar of which is almost as often found at turnip bulbs as that of the turnip moth; cabbage moth, the great yellow underwing, and some other kinds, the caterpillars of which more or less frequent the surface of the ground, do infinite harm, both in field and garden. In some cases, like the turnip moth caterpillars, they feed at, or bellow, the ground-level on almost every common root crop, or corn crop, they can reach; and when the weather is too severe in winter for them to continue feeding in the turnip bulbs, they simply go down deeper for a time, and, after coming up again to feed, turn to chrysalids in the ground in the following spring or early summer. Others, like the caterpillars of the cabbage moth, feed in the hearted cabbage, and turn to chrysalids in, or on, the surface of the ground before winter. But, whatever slight difference there may be in the habits of these various kinds of thick fleshy caterpillars, about an inch and a half long, which we only too often find either at the roots or on the leaves of the cabbage and turnip, this special point of their usually passing the winter under ground puts them very much in our power.

Before the caterpillar turns to the chrysalis, it makes a cell in the earth, in which it is protected from wet and sudden changes of temperature, or it seeks or prepares a safe resting-place for its change, or for a time; and so long as the caterpillars are thus protected no amount of cold to which they are here exposed will, as far as we know, do them the least harm. But if they are thrown out of these shelters to the influence of drying winds or hot sunshine, or to lie soddening helplessly on the surface in moist or muddy ground, or to being frozen in these states, then their constitution will not bear it.

If the caterpillars are turned up too soon, that is, either before they are torpid, or before they have changed to the chrysalis, they will simply go down again. If the soil is turned up when they are gone down very deep, they will not be the worse for what has been done above them. Each worker must look a little for himself, for dates and habits differ with climate and other things; but a little careful observation made by turning over the earth, so as to see where the creatures are, will be well repaid. They are quite large enough to be easily seen, if they are in numbers to need attention. This principle may be worked both in winter and summer—with caterpillars that turn to chrysalids under ground or in cocoons above ground, and with those that frequent leafage of trees or roots of grass, as well as those we have spoken of.

The common cabbage and turnip surface caterpillars will be found thus (or when time has elapsed for their change to take place), in chrysalis state, on or in the ground near where they fed.

The beet and mangold moth (silver Y moth) caterpillar spins a cocoon on, or not very far from, the plants it infested; and in all those cases, and scores of others, much good may be done by turning up the chrysalids, destroying the weeds they harbour in, and using all other methods of treatment, which a moment's thought will suggest, to destroy the pests.

Clearing all weeds that attract the moths is one method of preventing increase. The constantly increasing amount of insect attack is in part because of the constantly wider spread of cultivated land. There is a much greater amount of special crops, such as special insects feed on; and instead of there being, as in wild districts, perhaps, one plant in a hundred that may suit the caterpillar, there are districts all through the country where nine-tenths of the growth are its chosen food. If, therefore, in addition to the crop food, we let weed food collect in our borders, we add most needlessly to our troubles; and by clearing and burning these patches round garden and fields we may do a deal of good.

When attack is bad, the chief thing to trust to is fertilising dressing; but sometimes dressings of gas-lime on the land, and on the plants, will check attack to a serviceable extent. This has been found useful in the attack of caterpillar to hearted cabbage in the autumn. The gas-lime falls down among the leaves, and thus fills the parts where the caterpillars shelter by day, with what, to a certain extent, keeps them out, and is not pleasing to them.

It was formerly difficult to apply this knowledge practically; but now, looking at the variety of implements which have been recently introduced into this country, suitable for spraying or washing either orchard tree leafage or that of field crops, there would be no difficulty in experimenting, at least on orchard foliage, as to the effects of cold water in clearing off caterpillar presence.

The treatment for prevention of surface caterpillars may be shortly described thus:—Turn them up by cultivation where land is known to have been infested; and where catch-cropping is practised let the field be cleared of all food at least a fortnight before a new crop is put in; keep up the strength of the crop, but use remedies if you can—if they will be sure to destroy the grubs.

In a very large number of attacks, it is the worst possible practice to try to work directly on the grubs; you must counteract their mischief, rather than try to get (literally) hold of them; but with the large moth grubs, which are often one, instead of a score of hundreds, to a plant, the case is different.

For the same reason, birds help us much with some kinds of moth caterpillars. They can bore down, and draw out these large grubs, without the broadcast destruction which often follows on their services in searching for wireworm.

The crow, raven, jackdaw, rook, and partridge, are all said to be of use in clearing away the caterpillars of the turnip moth; and in the case of some of the swarms of small caterpillars which attack forest trees, especially the small green oak-leaf roller (*Tortrix viridana*), the flocks of birds which collect when great attack is going forward are our only helpers.

MR. J. B. FERGUSON ON COFFEE IN BRITISH CENTRAL AFRICA.

Mr. Ferguson, the coffee expert in the service of the African Lakes Corporation has paid a visit to Zomba and the neighbouring plantations, and has been kind enough to give us some notes on the subject of the impressions he has gained in British Central Africa.

Mr. Ferguson was unwilling to give a final opinion as to the future prospects of this Protectorate in the matter of coffee growing, on the ground that he had not yet completed his tour of the plantations, and also considers a longer residence in the country necessary. He has, however, visited most of those belonging to the African Lakes Corporation, both in the Shire Highlands and in Angouiland; the estates of Messrs. Buchanan Brothers, and also those of the principal traders and missionaries, and so far as he has gone his opinion is a favourable one, if shade and manure be supplied to the coffee.

He states that there is not a trace of coffee leaf disease in the country, and he does not attach much importance to the minor ills to which coffee is subject here. He mentioned three things however as worthy of attention, *viz.*, the Borer Grub, want of Manuring, and Drought.

Mr. Ferguson informs us that, the British Central African borer is different from the Indian, inasmuch as the former ultimately becomes a beetle, the latter a fly. The presence of borer may be detected in several ways: dust from the holes is scattered on the ground round the base of the tree, and at the time of blossoming, after a shower of rain, the flowers open up immediately in the case of healthy trees, whereas in the case of trees affected with borer the blossoming "hangs fire."

Planters in this country simply employ boys to pull out the grubs with a piece of wire. Mr. Ferguson does not think this plan effective. He tried it on some trees at Mandala, but after having extracted the grub, he cut down the treee, divided it into sections, and found several other borers still in it in different stages of maturity. A tree that is bored is not in a healthy state, and probably some of the light berries may be produced from this cause. Mr. Ferguson, therefore, recommends that a tree with borers should be dug out at once and burnt, so that all the borers may be destroyed, otherwise the tree becomes a nursery of borers. The matured insect, in the form of a beetle, is said to appear generally at the beginning of the rains, therefore, the proper time to get rid of borers is during the dry season before the beetle appears, otherwise a fresh series of eggs will be deposited under the bark of the coffee tree and a new progeny established.

Drought, Mr. Ferguson thinks, might be successfully counteracted by efficient shade. He states that there is not so long a drought in Ceylon and India, as in B. C. A., as between wet season and wet season there are what are called "blossom showers," often amounting to several inches of rain; whereas, in most parts of British Central Africa there is very little rain between the wet seasons. Mr. Ferguson tells us that the principal shade trees grown in Ceylon and India are different varieties of the ficus, the best of which are of the Banyau species. There are about eleven different varieties of Ficus, some of them natives of British Central Africa, but all of them different from the Indiau species. Good specimen may be seen in the Residency garden, Zomba. The banyan tree is of this species, and Mr. Forguson was very emphatic in recommonding it for shade purposes. He says it is very generally used in India, and the most valuable estates in Coorg are those shaded with it. The reason why this tree is a favourite is that the wood it is composed of coutains a great amount of moisture, and has thus a eooling effect on its surroundings: again, the leaves fall off during the cool season, when shade is not required, and it is thus a souree of manure, while, on the other haud, during the hot season it is always in full foliage and affords perfect shade, and the peculiar formation of the branches prevent "drip," and tends to carry the rain falling on the tree down the main stem to the ground.

As to manuring, tho manure generally applied in India and Ceylon is that obtained from cattle sheds and stables, also bone meal and poonac (oil cake). A small pit is dug near the tree, the manure placed in it, and then covered up again.

In a few cases recently where young planters have opened up estates in B. C. A., they have collected a great deal of the brushwood and branches together and burned them. The ashes have then been scattered on the plantations in small patches round each coffee tree, thrown on the surface. Mr. Ferguson condemns this practice. Ashes he considers a good manure when mixed with other manures into a compost, or when applied alone, but it should not be scattered on the surfuce of the ground, but in a pit near the tree, and then covered up or dug into the soil. If thrown about loosely the wind carries it away altogether, or it may be carried entirely off the plantation by a heavy shower, especially if the land is on slope,

Mr. Ferguson attachs great importance to shade. He says that not only does shade counteract long spells of drought, but, as in Coorg, it is a certain preventive of coffee leaf disease. He considers that there are trees indigenous to British Central Africa which might do for shade, but thinks it would be well to introduce seed of trees which have beeu found by experience to give admirable shade, such as the banyan tree from India.

Note:—As there appears to be some doubt as to the generally understood meaning of the word "Banyan" Tree, we have asked Mr. Alexander Whyte for information on this point, and he has been good enough to give us the following note:—"It is quite customary, both in India and Ceylon, to apply the term Banyan to other members of the genus of Ficus as well as to Ficus Indica, the true "banyan" tree. It is perhaps a loose way of speaking, yet I have seeu it frequently in print and it has been used by distinguished authorities, e. g. Sir Emmerson Tennant, if I mistake not, while referring to Ficus Religiosa, speaks of it as the 'Sacred Bauyan Tree,' though it has two other names well-known in India aud Ceylon—'Pippul' Tree, or 'Booh' Tree. There is one word of caution I should like to give with regard to the opinions of coffee experts who come from other coffee growing countries to the Shire Highlands. It is impossible to suppose or expert that one who is new to this country, although with very large experience in coffee, can definitoly say at once that what is good in India or Ceylon for coffee may be equally good in this country. Innumerable valuable hints and suggestions can be had from an experienced coffee grower from an outside country, but, at the same time, as the conditions may be so different, it is well not to adopt in too great a hurry the course which is taken in such other countries, as possibly further experience here might show that they require modification."

DISTRICT OF THE ARUWIMI, CENTRAL AFRICA.

This district is really an annex of that of the Stanley Falls. All that I havo said of tho one might be applied to the other. The portion between Bena-Kamba and Basoko, along the Lomami consists of sandy plains unsuitable for planting, so also with the bauks of the lower Aruwimi, and here there are rapids also......It would not do to cultivate coffee for export beyond the rapids or in the Nellé district. According to what is told us of this country, it is to the north of the grand forest what the Manyéma (grass region) is in the South:—Savannahs, very populous, well-cultivated by the natives, who belong to strong races and are susceptible of great improvement.

Here and there along the river between the Lomami tributary and the eastern frontier of the

district cultivation might be attempted in well-chosen spots. The numerous ant-hills point to the existence of clay at least in the subsoil.........

At Basoko there are also some plantations, the importance of which rivals that of Stanley Falls. They are on the borders of a stream in claycy and alluvial soil. In spots, however, which the natives had cleared to grow manioc, and had abandoned, the coffee plants looked stunted, proving that the soil was not originally very fertile. At Basoko I saw 800 coffee bushes, 4 to 6 years old, 3 to 3½ metres high and nearly 2 metres wide; 270 cacao trees 4 to 5 years old and 3 to 3½ yards high, 3½ yards apart, and bearing abundantly. There were many more plants recently put out and also in nursery. From one of the coffee bushes planted in 1890 I saw the blacks who accompanied me, gather 23 Kilo (69½ lb.s) of ripe berries and 5 of unripe ones. That was on the 23th January, and in December M. Hénan, the planter at the station had gathered 7 kilos..........

Some figures as to the cost of planting and cultivating may be interesting: it is difficult to estimate the cost of clearing as much of that was done by members of the staff (soldiers) in spare hours. At Basuko and at Coquilhatwille, the clearing and preparing of the soil took 1,000 days, which I value at ¼ franc each, *i.e.*, frs. 250. For the maintenance of 100 *hectares* (250 acres) 250 men or women will be necessary, say 300×25=750 days per *hectare*, (2½ acres) that is an annual outlay of 200 francs per *hectare*.

Including all these expenses, then, each kilogramme (2¼ lb.) of coffee harvested in Upper Congo will have cost at most 20 *centimes* (about 2d.) for labour. I reckon it will have cost for expenses of administration, and direction, over-sight and other contingencies 2½ more. As for the cost of transport from Stanley Falls to Antwerp, when the railway is finished, they will not be quite 4½, say 4d. The kilo of coffee arrived Antwerp will have cost nearly 1 frs. and can be sold for 2 to 2·20 francs, and we know that a plantation of 100 hectares would produce from the 6th year at least 150·000 kilos, of coffee. This is an ideal that it is possible to attain in many parts in the Congo.

I have also collected some figures upon Cacao. On one tree five years old, cultivated at Basuko, I counted 34 fruits, some fully, some half grown. Ten of these ripe ones contained 427 seeds in a dry state. The 34 fruits would have given about 1,200 grammes (2½ lb.) of dry seed. The kilo of Congo cacao is valued at fr. 1·20; at that price a *hectare* (2½ acres) of cacao trees planted 9 ft. apart, would bring in 1 kg. 200×800=960 kilo. worth 1,152 frs. from the 5th year. It is decidedly less profitable than an equal area of coffee. As for the expenses of cultivation they are the same. If one takes into consideration the inherent difficulties in the cultivation of cacao (rich soil and sheltered situation needed, delicate seeds, difficulty of transplanting) it will be agreed that cacao is not so suitable for the Congo as the Liberian Coffee.

There is one other tree frequent in the sandy forests of the Aruwimi, that is the tree that gives the copal gum, the *Trachylobium*. It belongs to the Leguminosæ, has bifoliate leaves, irregular ptcals and is of coriaceous texture. The tree is freely found on the borders of streams and attains a height of about 30 ft. The station of Asoko buys on an average 600 kilos. of copal gum per month. Its valno in Europe is very variable. The district could probably produce 20 tons a year, probably more.

During 1895, the district sent about 100 tons of Rubber, and the quantity might be doubled or trebled. Oil Palms are very frequent on the left bank of the river. "Raphia" and "panza" are also very abundant. Basuko station has also been well planted with fruit trees—citron, mango, papua &c.,

DISTRICT OF THE BANGALAS.

This district also presents vast sandy surfaces alternating with slimy and more fertile soils, but the clearing of the forest has disastrous effects, so that in 3 or 4 years, the good soil has often disappeared and white sand only remains...... But at Umanghi an agricultural station has rightly been planted, for there we find a clayey soil and many ant-hills. 5,000 coffee plants and 2,000 cacao are planted, and as the forest had been thoroughly cleared, plantains are planted for shade; the vigour of those bears witness to the fertility of the soil........

The best shade for coffee is certainly secured by the partial clearing of the forest...Hence they have started a small plantation 2½ miles from Makolo quite in the forest....But hitherto the labourers have had to walk there and back from Makolo, this, is a waste of time....To keep the field clean, 3 women were set apart for every 2½ acres and had no other work; they even sweep up the dead leaves—an unnecessary work; I rather think it would be better to fork up the weeds and not to destroy them; on sloping land the washaway would be prevented....

The plantations altogether in this station comprised 230 acres of cleared land, 28 of which were at Makolo; 123 were planted with coffee and 25 with cacao. But many plants had been put out with only 2 leaves and should have remained longer in the nursery. An apparatus for cleaning the coffee by John Gordon & Co. has been sent here, but is not yet working.

Among the products cultivated by natives I notice the ground nut, sugar-cane, rice, manioc and beans.

The district produces 400 tons of Rubber annually. The forests are rich in oil-palms (élaïs) *panza* and *raphia*, and there are also copal-producing trees.......
—*British Central Africa Gazette.*

CRETE AND ITS PRODUCTS.

It has been placed to the credit of the late Emperor of Brazil that on being shown the fly-wheel of a certain steam-engine, and informed that it made over 300 revolutions per minute, he remarked that it was far ahead of his country, for they could only muster that number of Revolutions in a year; and so of Greece it may be remarked that many have been the Revolutions during the past hundred years, especially in Crete—one of those—

"Isles of Greece,
Where burning Sappho loved and sung"

and to-day the whole of Europe and Great Britain is exceedingly perplexed as to what is to be the order of things in Crete, and in Greece itself, in the days to come. We can only express the hope that freedom and prosperity may be the outgrowth of the present imbroglio, for then horticulture and agriculture will flourish on this borderland of the East. As to the resources which these two are capable of yielding in freedom and peace it were difficult to say. The island lacks proper cultivation, is thinly populated, its exports are limited in value and number—olive oil, wine, raisins, soap, Locust-beans. Valonia, Almonds (shelled), and some Oranges. Of the products now shipped from the various Cretan ports, a fair proportion finds its way to this country—in the shape of olive-oil, raisins, Locust-beans, Valonia.—*Gardeners' Chronicle.*

ANOTHER BIG BRAZIL COFFEE SYNDICATE.—In a London paper dated April 10th, by the French mail, we find the following important paragraph. It would look as if "coffee" were going to be overdone as much as "tea":—

A large and extensive group of coffee plantations, situated in the San Manuel district of the State of San Paulo, have been sold to a Dutch syndicate for the purpose, it it believed, of flotation as a company on the European markets. The purchase price is stated to be £500,000. It is understood that negotiations are in progress for the purchase of other coffee estates in the same province by various syndicates, both English and Continental. The flotation of the Dumont Coffee Estates on the London market in the early autumn of last year has encouraged the undertaking of similar business in other quarters, and more than one flotation is expected at an early date.

THE REPORT ON THE CAWNPORE EXPERIMENTAL FARM

for 1895-96 has reached us. The Farm is under the immediate charge of the Principal of the Agricultural School at Cawnpore, who must be highly gratified with the praise bestowed on the farm by no less an authority than Dr. Voelcker; for the latter, in his report on the "Improvements in Indian Agriculture," records the following opinion:—"In fact, I was much pleased with the Cawnpore Farm, and was not prepared to find in India anything which so nearly came up to my idea of what an experimental station should be."

Among other matters which occupy the attention of the farm authorities is the distribution of implements, of which we read that there was a remarkable increase in the number distributed during the year. This is said to be due chiefly to the efforts of the representatives of the department in bringing the improved implements into prominence at the Agricultural Shows. We note that the implements were either sold or given out on hire, or for trial. Under the head of "Distribution of Seed," we find that between 20,000 and 30,000 lb. of seed were distributed during the year under report from the seed-store attached to the Farm; while under the head of Cattle, we have a note on the Veterinary Hospital, where the number of patients treated was 72, and the cases cured 70. The results in the latter case are naturally considered to have been encouraging. Among other interesting experiments are those with reference to Cotton Cultivation, and the various systems of conserving Cattle Manures, which are said to be likely in time to lead to some results of economic value.

We have only been able to refer to a few of the striking features in this Report, but our perusal of the document leaves us no room for surprise that so eminent an authority as Dr. Voelcker should have spoken in high terms of the Cawnpore Farm. When may we expect to see a like institution in Ceylon? Not while the Government do not provide a vote for such important work as the distribution of seeds and implements, and for the carrying out of useful experiments in connection with their Agricultural School. In this connection we would emphasise the importance of a Veterinary Hospital such as that referred to in the Report (worked, if possible, in connection with the Society for the Prevention of Cruelty to Animals, as in Bombay) seeing that the Government have a highly-paid Veterinary Surgeon, who is apparently not over-burdened with work or responsibilities. A veterinary hospital would not only be the means of popularizing European veterinary treatment, but would also afford a training ground for students of the Veterinary School whose opportunities for acquiring a practical training in the veterinary art must be very small. It is a matter for regret that the Government of Ceylon did not think of inviting an expert, such as Dr. Voelcker, to draw up a scheme of work for the Ceylon Agricultural School at the same time that he was reporting on the "Improvements in Indian Agriculture."

THE ESTATES COMPANY OF UVA, LIMITED.

The annual ordinary general meeting of the above Company was held at the Company's Offices, No. 7 Queen Street, Fort, Colombo, at 12-30 p.m., on Saturday, 27th March, 1897.

The directors' report was as follows:—

ACREAGE.

	Tea in full bearing.	Tea in partial bearing.	Tea not in bearing.	Total Tea.
Dammeria Group ..	436	29	110	575
Battawatte and Forest Hill	209	167	211	587
Gampaha	332	20	119	471
	977	216	410	1,633

	Other Products.	Timber Trees and Grass.	Forest and Wasta land.	Total.
Dammeria Group ..	43	23	502	1,143
Battawatte and Forest Hill	5	14	141	747
Gampaha	81	82	232	866
	129	119	875	2,756

(Some coffee also remains amongst tea and timber trees on Gampaha aun Battawatte Estates.)

The Directors have now the pleasure of submitting to the Shareholders the accounts for the past year.

The tea crop, which was estimated at 350,000, lb. amounted to 350,102 lb in addition to which 32,025 lb. were made from purchased leaf. Of the total quantity, viz: 382,127 lb. 372,818 lb. have been sold at a net average of about 48½ cents per lb. A reasonable valuation has been placed on the unsold portion of the crop, viz: 9,309 lb. The receipts for manufacturing tea for other estates amounted to R5,679·32.

The Coffee crop was slightly under the estimate of 970 bushels, having amounted only to 918 bushels, as against 3,070 bushels in 1895. As will be seen from the Working Account, the Cocoa and Cardamom crops slightly exceeded the estimates of 50 cwts and 500 lb respectively.

The expenditure on Working Account amounted to R148,451·80, which included the whole of the Salaries and Establishment charges on each of the Estates.

During the past year the Tea acreage was increased from 1,571 to 1,633 acres, partly by the planting up of land under other products and partly by opening up new land. A small addition of Acres. 12·3·18 has been made to the Dammeria Group by purchase of that extent of Crown land. The cost of these extensions, as also upkeep of the Tea fields not in bearing, amounting to R26,854·17, is added to the cost of the Estates. The cost of additions to Buildings and Machinery during the year amounted respectively to R10,307·60 and R10,530·80.

An issue of 99 shares of R500 each was made in terms of the Directors' Circular letter of 26th March last, these shares being taken up by the holders of the then existing shares at a premium of R100 per share. The paid up Capital of the Company is thus increased to R700,000 and a sum of R9,900, the premium on the new issue, is placed to credit of Profit and Loss account. The Diretors recommend that this premium be transferred to Depreciation Account.

After making provision for ordinary depreciation of Buildings and Machinery a sum of R58,867·38 is available for distribution, which will be reduced to R48,967·38 by the transfer of the share premium as above referred to. The Directors recommend that a dividend of 7 per cent for the year be declared on the Capital as at 1st January, 1896, viz., R650,500. and that, in terms of the issue, a dividend of 3½ per cent be declared on the Capital last issued, v.z., R49,500. The payment of these dividends will absorb R47,267·50 and leave R1,699·88 to be carried forward to the current year's accounts.

The question of improved outlets for both Battawatte and Gampaha has been engaging much of the attention of the Directors. An extension of the Madulsima road through Battawatte and Forest Hill, as a Grant-in-Aid road, is likely to be undertaken at an early date, while the Directors hope in a short time to have matters ripe for an application being sent in to Government for the very necessary extension of the Uda-Pussellawa road.

The crops estimated for the current year are 415,000 lb. Tea, 590 bushels Coffee, 60 cwts. Cocoa, and 600 lb. Cardamoms, while the estimated expenditure on Working Account, viz., Rs. 150,554, provides for the manufacture of 40,000 lb. Tea for another estate.

The outlay on Capital account, which is estimated at Rs. 13,922, will be for upkeep of the Tea fields giving no return and extension of the area under Tea, as also for additional coolie lines &c.

An extension of the Gampaha Factory is also in contemplation but for this no estimate is yet framed, while the cost of providing improved outlets for both Gampaha and Battewatte will probably have to be met

Messrs. Carlyon, Figg and Chas. Young having resigned their seats on the Board on leaving the Island, Messrs. A. Thomson, G. H. Alston and W.D. Gibbon were duly appointed to fill the respective vacancies. Mr. C. A. Leechman having also retired from the Board, Mr. E. J. Young was appointed in his stead, and that gentleman now retires by rotation.

The appointment of an Auditor rests with the meeting.—By order of the Directors,

WHITTALL & Co., Agents & Secretaries.

Colombo, 17th March, 1897.

CINNAMON SALES IN LONDON.

The particulars of the last quarterly sales of cinnamon, held in London on the 22nd ultimo, which we published in our last issue, afford gratifying evidence of the correctness of the anticipations in which we had indulged, of a permanent improvement in the value of, perhaps, the oldest of our staple exports. After a period of long, and almost ruinous, depression, our historical spice began looking up a year or two ago; and although it was feared, from the suddenness and extravagance of the first considerable rise, that the upward tendency was artificial—as indeed it was on that particular occasion—and would be only temporary, the prices which then ruled have been fairly well maintained. The speculative prices which certain medium marks secured, have of course not been realized since; but there has been no general drop. On the contrary, almost every sale since then has proved satisfactory to the producer; and the confidence we expresssed, that it is a better demand, and not speculative operations, which first provoked keener competition, seems fully justified. The main reasons which point to this conclusion are that almost all the cinnamon brought to the hammer, is knocked down in the auction rooms, the balance finding ready buyers immediately after, at current or improved rates; and secondly, that the demand is pretty evenly distributed, and all sorts find buyers. Not only so, and not only that unsold lots scarcely ever have to be reserved for the next quarterly sales, as happened pretty frequently a few years ago, but the difference in price between fine and medium bark is not as pronounced as it used to be. For many years, and until about two years ago, fine pale cinnamon of the best known brands fetched quite double the prices of medium marks; and often even more. Thus, we have known C. H. De S. (the De Soysa brand) realising for its firsts only 7d. to 8d., while Golua Pokuna would fetch 1s. 6d. to 1s. 7d. at the same sale. All this is now changed, and the relation of prices for barks which are pure and unadulterated, though they may differ greatly in thickness of quill and but little in quality of the spice, is more reasonable. Fancy prices for fancy makes are getting out of date; and the spice fetches about what it is really worth, with a reasonable allowance for more attractive appearance and the higher wages which have to be paid for the manufacture of fine quills. Thus, at the February sales the difference in price for Firsts ranged from 1s to 1s 6d; for Seconds from 11½d to 1s 5d; Thirds from 10½d to 1s 4d; and Fourths from 10d to 1s 1d. Fine bark may be said roughly to have fetched about half as much again as ordinary quills, instead of double or more. Then, the grading of ordinary bark showing a very inappreciable difference; the difference in price, too, was correspondingly small—from 10d for Fourths to 1s for Firsts; while in finely quilled cinnamon, the difference being more appreciable, the prices ranged from 1s 1d to 1s 6d. Again, the "unworked" cinnamon, which is sold as it is landed, without any manipulation in the Docks or Warehouses, and which the trade would not look at some years ago, was all competed for and sold at prices which approximated to those of ordinary bark, after they had undergone expensive unbaling, brushing-up and re-baling. From this last mentioned circumstance alone, we are justified in deducing a real demand, as the London monopolists were very strong some years ago in resisting the claim of exporters to have more frequent sales, and sales on samples drawn from one bale of each quality, instead of having every bale undone. So long as the demand was slack, producers were unable to enforce the last demand; but now unworked cinnamon seems to provoke as keen competition as worked spice; and what is more, prices have risen in face of infrequent sales. Our great staple tea has receded in price despite weekly auctions, while cinnamon, which had to abandon even monthly sales in deference to a ring in London, has risen. The fact is of importance in connection with the discussion on the fall of prices which tea has experienced, as it points to the supreme importance of the relation between supply and demand in regulating the market.

Turning to the catalogue we find that the old marks maintained their old pre-eminence, Golua Pokuna leading as usual, closely followed by Wester Seaton, Kimbulapitiya, and Mudaliyar Rajepakse's Kadirane properties. A. & Co. (MESSRS De Mel's Ekelle property), G. De C. (the late Mr. Gabriel De Croos' brand) come next, and then the great "unworked," led by the C. H. De S. marks. Of 1,248 bales offered, nearly 1,200 bales found buyers in the room; and it would be a mistake to suppose that the offerings were small. Although the quantity was short of that which was brought to the hammer in February last year, the catalogue of February 1896, it must be remarked, was exceptionally large. The February sales are generally light; and in 1895 they received only 766 bales or nearly 500 bales less than was sold last month. Since the sales, a firmer tone seems to prevail, so that the outlook is decidedly cheering, and proprietors have to be congratulated on the returning prosperity for which they had long to wait.

The following is the report on the last sales from one of the leading firms in the trade in London :—

London, 25th Feb. '97.

CINNAMON.—The first auctions of the year were held on Monday last the 22nd instant when 1,248 bales Ceylon offered against 1,792 bales at the February 1896 sales. There was a good demand and about 1,200 bales were cleared in the room with capital competition. Ordinary to medium qualities of quill sold steadily at par to 1/2 per lb. advance and the finer brands maintained the good advance established in November except a few bales of first and fourth sorts which sold at 1/2 to 1d. per lb. cheaper. Fine "worked" Ceylon sold: Firsts good to fine 1/ at 1/6; seconds 11½d. at 1/5; Thirds 10½d. at 1/4, and Fourths 10d. at 1/1.

The "unworked" spice sold (as landed) about 1,000 bales. Firsts ordinary to good 10½d. at 1/; Seconds 11d. at 11½d; Thirds 10d. at 11½d., and Fourths inferior to good 7½d. at 10d. per lb.

CHIPS &c.—48 bags sold at 3½d. and about 50 bags quillings &c., at 8d. at 10d. per lb.

	1896.	1895.	1894.
Stock of Ceylon 2,453 bales against	4,583	3,385.	3,515

The next sales are fixed for the 31st May.

LIVING ON COCONUTS.

The value of the coconut as food is shown ni a story from Pemba, Africa. One coconut, night and morning, kept a man alive for seven months under most cruel and trying circumstances. The man was a slave named Muftah, who ran away from his master an Arab, named Ali Bin Abdullah. His matter recaptured him, then treated him with horrible cruelty. He was put in irons, which were welded on his flesh near the ankles, and the irons were attached by a bar to a cleft tree. For seven months was Muftah kept in this position, exposed to all changes of weather, enduring noon-day heat and evening chill the torments of insects and semi starvation. A coconut, night and morning, was his only food and drink. He was eventually rescued by H.M.'s Consul at Pemba, Dr. O' Sullivan, who had him sent to Zanzibar. That he lived so long under such conditions is a matter of surprise, and speaks well for the food value of the coconut.—*Produce World.*

PRODUCE AND PLANTING.

TEA BLENDING.—The development of tea planting has led to a similar growth in the business of tea dealing, especially in that department of it in which blending is made a conspicuous feature. While many of the old firms of tea dealers still maintain their trade and position, several comparatively new firms have entered into competition, making a great point of the art of judicious blending which they cultivate. The *Grocer*, recently describing the new premises of one of these firms which it states by the way, were only established quite recently, says:— "The floors are fireproof, and the different departments are admirably suited to the purposes for which they are intended. Goods delivered from the bonded warehouses are at ouce lifted by means of a crane fitted with the 'friction jigger' to the top or third floor, designated the receiving room. Here the teas are fed into cutters, which reduce the leaves to a uniform length and free them from extraneous matter. From these machines they pass through to the 'hopper' on the second floor. The capacity of the drum is about twelve chests, or some 1,200 lb, and this is directly connected with the mixing machine (of equal capacity) on the first floor by means of a capacious funnel. Thus it will be seen that as soon as the 'mixer' is cleared another parcel can be introduced in a few moments, and a very large quantity of tea can be dealt with in a brief period. The ground floor forms the delivery department, and it is to this room that teas packed on the different floors and ready for delivery are conveyed in the powerful hydraulic lift. At the time of our visit the building was not out of the contractors' hands, but large numbers of emp'oyes were engaged on the various floors in the various processes involved in preparing the firm's packet and loose teas for the market. In the basement a six-horse-power nominal Crossley gas engine has been erected, and here also a circular saw is to be laid down in order to facilitate the work of chest making. Special arrangements have been made for keeping the rooms free from dust, and for drying labels rapidly by the provision of powerful fans, and the ventilation has been carried out on scientific principles." The firm referred to, it appears, "offer every facility to retailers to adopt the 'own name and label' system of trading, and they supply photographs of tea plantations for window display. The care they devote to blending is indicated by the fact that samples of the drinking-water used in almost all parts of the country are kept on the premises."

JUST ROMANTIC ENOUGH.—It is not surprising that the British youth yearns after a tea planter's life as he reads the glowing accounts given of it in some of the light literature of the day. Even the globe trotters are impreseed with the glimpses they get. In a book called "Romantic India," just published by Mr. Heinemann, we find the author, a Frenchman, M. Andre Chevrillon, indulging in a glowing sketch of a Ceylon tea garden proprietor. We knew that all tea garden proprietors in Ceylon are not "fat, gentle, pale," and that sitting in *chaises longues* with cigarette and book is not the lot of the "creeper," but the following description reads well:— "Yesterday," says M. Chevrillon, on the railway, returning from the interior of the island, I met a Hollander; fat gentle, pale, peaceful of gesture, scanty of speech. Of the Dutch temperament there is left only the phlegm and softness; the sanguine flesh tint has disappeared under the heat. After five minutes he asked me my address that he might send me some flowers; for my pockets overflowing with roses, jasmines, mimosas, my admiration for the very great size of the floral display on every side had surprised him. After a time I learned that my man is a native of Ceylon, that he has tea plantations in the mountain, and lives with his family at Colombo. To-day I dine with him. His bungalow, situated in the cinnamon gardens, is like a villa of some rich old Roman, deliciously bright and cool, immense halls separated by partitions of fragrant woods, carved and cut in fretwork, great wicker *chaises longues*, where one may recline all day with cigarette or book. The children pretty, but singularly pallid, a translucid, waxen tint, fined down and enfeebled by the climate; a household of servants, who seem very much beloved. Parents and children speak Cingalese to them."

THE BOARD OF TRADE RETURNS AND PRODUCE.—The striking feature of the Board of Trade returns of our foreign and colonial trade during February is that the declared value of the imports into the United Kingdom again shows an increase (£1,768,428), and the declared value of our exports of British and Irish produce and manufactures a decrease (£1,839,418) for the month. Striking increases are found under the head of duty-free and dutiable articles of food and drink, and represent *inter alia* increased imports of wheat from the United States and Turkey, flour from France, maize from Argentina, coffee from all sources of supply except Ceylon and Brazil, and tea from Ceylon and India.

COOLIE LABOUR IN THE WEST INDIES.—The official report referring to Jamaica is interesting alike for its statistics and its reference to the East Indian coolies there. There is a decline in the value of the xports from the figures of former years, the difference s compared with 1894 95 amounting to £48,317

Coffee, bananas, sugar, rum, and cocoa are the chief items that have declined, whilst the exports of oranges, grape fruit, ginger, lime juice, and pimento have expanded. It may be interesting to state as regards oranges that the total export in 1895-96 was 97,025,398, of the estimated value of £169,794 these figures exceeding the sum of the exports in the four preceding years by 12,062,751 in number and £44,319 in value. The island is thus continuing to reap the result of the misfortune which befell Florida in 1894. It appears that the East Indian population thrive in spite of the depression in the sugar industry, which has little if any effect on their average wages, the greater number being now employed on fruit-growing properties. One high-caste East Indian, formerly an immigrant, is now the possessor of over 2,800 acres of land, and has been elected a member of the parochial board of Trelawny. Over three hundred coolie adults with their families left for Calcutta in the Government vessel on May 18, 1895. Ninety-nine adults who had claimed and were entitled to free passages did not present themselves, and the ships had to be despatched short of the full complement. The amount of £3,139 was taken away in Treasury bills by eighty-nine families. A further instance of the prosperity and thrift of the East Indian population is shown in the increase of savings' bank depositors compared with 1894 of from 793 to 1,029, and of deposits from £13,958 to £22,680, notwithstanding the closing of several accounts by coolies.

A New Constituent of Indian Hemp.—The hemp plant, Cannabis saliva, grown in temperate countries, produces a valuable fibre ; but in India the fibre produced is of little use in the arts, and the plant appears to devote its energies mainly to the production of a resinous secretion, which, owing to its soporific properties, is a very valuable medicinal agent. The resin exudes from the plants, and is collected by men walking through the fields with long leathern gaiters, to which it sticks; it is known as "charas," while the tops of the plants collected with the resin on them, and matted together by pressure, form "hashish." Very many attempts have been made, says the *Imperial Institute Journal*, by chemists to isolate, from the various Indian hemp products, the principle to which their medicinal activity is due, with the result that many and very different substances have been from time to time regarded as the active principle. The most recent investigation of Indian hemp is that of Messrs. Wood, Spivey, and Easterfield (*Journal Chem. Society*, May, 1896), who obtained by fractional distillation of "charas" under a very low pressure a resinous substance to which they gave the name "Cannabinol." At ordinary temperatures "Cannabinol" is a viscous resin, melting to a thick oily liquid when the containing vessel is placed in warm water. The therapeutic action of this substance has been examined by Mr. Marshall, M.B., assistant to the Downing Professor of Medicine at Cambridge University (*Lancet*, Jan. 23, 1897). Mr. Marshall made two experiments with the drug upon himself, taking on the first occasion from 1 to 15 gram., and on the second a smaller quantity. The first dose did not cause sleep, but induced a peculiar state of delirium, accompanied by complete loss of memory and all sense of the passage of time. This state of delirium alternated with perfectly lucid intervals. On the second occasion the small dose taken produced similar effects in a milder form and for a shorter time, being followed by sleep, during which a series of visions were seen, usually of a grotesque character. The use of the drug seems quite unattended by any unpleasant after-effects such as are experienced with some other narcotics. It was tried on one patient suffering from insomnia with very good results. The terpenes obtained as a first fraction in the preparation of "Cannabinol" were also purified by Messrs. Wood, Spivey and Easterfield, and sent to Mr. Marshall for therapeutical experiment. They were found to act exactly like ordinary terpenes, so that they are not connected with the characteristic action of the hemp products.

Produce from the Gold Coast Colony.—The Go[ld] Coast Colony is in a flourishing condition Notwit[h]standing the general unrest in the colony during th[e] year 1895, owing to the Ashantee expedition; th[e] total value of trade increased by £146,166, or roughly at the rate of 9 per cent., the total of exports and imports for the year being £1,809,340, contrasted with £1,663,173 in 1894. In 1895 the quantity of rubber exported from the Gold Coast increased by 1,000,000 lb, a total of 4,022,385 lb comparing with 3,027,527 lb, the values being £322,070 and £232,550 respectively. The year's output was the highest on record. Cacao, coffee, and kola nuts were imported in larger quantities.—*H. and C. Mail*, March 12.

TAMIL COOLIES AND LABOUR SUPPLY.

To the Editor, *British North Borneo Herald.*

Sir,—In the issue of January 1st there is an article about the Indian labourer *i.e.* the Tamil cooly. You scarcely give him fair play when you say he is physically unable to perform heavy work, while towards the end of your article you say he is by no means a bad road maker and can cut drains; also you recommend him for earth works. These works are usualy considered the heaviest you can put a cooly to perform. Evidently the writer of the article knows nothing whatever about the Tamil cooly. I have had several years experience with Tamil labour and have always found them capable of doing the heaviest work with ease and neatness which the Malay lacks.

Secondly, you talk of obtaining Tamil coolies through Agents. This would be a most unsatisfactory way, as planters in Ceylon always send their Kanganies to get the coolies who know which men are suitable to work on estates and not an agent who will pick up any coolies for the sake of his commission. I should suggest sending some one to Ceylon and from there taking a Kangany with him to the Indian Coast to pick the coolies. After the Tamils have once got a footing and find they are well treated others will follow, by sending a trustworthy Kangany back to fetch more each year as required.

The Dusun cannot be put on the same footing as the Cinghalese for felling and clearing ; the latter is much quicker, lops better, and works steadier.—Yours, etc. E. Walker.

Manpakad Estate, 27th January, 1897.

[The writer of the article had had long experience of each form of labour, Tamil, Chinese and Malay, and still maintains that individually the Tamil cannot or will not do as much earth cutting as a Malay. In other words it takes three Tamils to do the work performed by two Chinese or Malays. Coffee, hemp and rhea were specially excepted. Our correspondent overlooks the fact that as regards most of the estates and clearings there are no kanganies to send to India and neither tobacco planters nor woodcutters have as yet cared to employ Tamil labour. The "Agency" question is easily solved by the rejection of unfit coolies at the Agent's expense. Dusuns may be worse than Cinghalese as woodcutters but the men mostly employed on the East Coast are Sooloos, Javanese, Banjerese, &c. We should be glad if Mr. Walker would state whether he considers Tamils equal *man for man* to the Chinese. They are doubtless cheaper per head and bring wives and children who can also work. But experience in the Malay Peninsula shows that owing to their much greater laziness, liability to sickness, and less strong physique there is no appreciable saving by employing them. We are neverthelessglad that Mr. Walker has written as the Labour question in North Borneo annot be too thoroughly discussed.—Ed.]

Progress in North Borneo.—A correspondent writes :—"The mail brought out word that one of our principal Tobacco Companies was sending a manager out to open a coffee estate on one of their blocks of land. A Syndicate are about to bore for mineral oil on Province Dent,'

UPPER DIMBULA: ITS VEGETATION AND SCENIC BEAUTY: VARIETIES OF TIMBER-TREES; INCREASE OF BIRDS.

In the early days of coffee planting, Dimbula was divided into "Upper" and "Lower." In reality there was not much difference between the elevation above sea-level of the plantations in each division—Union and Bogahawatte ran as high as Louisa and Radella; but the approach to the one was from Kotmale, while the others had their outlet viâ Nuwara Eliya. There is no question now, however, as to the estates which run over 4,500 to 5,500 feet meriting for their district, the distinction of Upper Dimbula. We refer especially to those between Great Western and Nanuoya, above or on each side of the railway line; and the plantations along the headwaters or crowning the slopes between the Nanuoya and the Agraoya until we come under the shadow of Kirigalpotta or touch the far-extending Bopatalawa patanas.

If, on the one hand, the railway has done inestimable service in enabling lowcountry residents and visitors to enjoy some of our finest mountain scenery, how much is lost from the inclination to hurry through each district and to be contented with a glance at the general outline? The old Gampola and Ramboda and still more the Ramboda and Nuwara Eliya coaches were tedious and trying in many ways; but what enjoyment they afforded in the details of mountain, stream and valley scenery, now seldom or never seen by the ordinary visitor or traveller. In the same way we may say, after a brief sojourn within its limits, how little is known of the attractions and scenic beauty of Upper Dimbula from a mere trip by the railway along the one side of it. To see and appreciate Dimbula (as well as the adjacent dist icts) nothing but a driving or riding (or to a less extent a bicycle) trip covering every mile of its "pucka" roads can suffice. In any case, let no one say they know anything of the district, until they have travelled by the Agraoya, up as far as the Agras road will take them; and from Lindula alongside the Dambagastalawa-oya past Kowlahena and Henfold, Maria and Lippakelle, Macduff and Cymru right into what Wm. Smith used to call "Molesworth's Railway Gorge" at the foot of Elgin estate; and yet again until they have traversed the road between Matakelle and Lamiliere and along a series of plantations the Dimbuldanda-oya till they enter the fine avenue shaded by grevilleas or eucalypts on Lorne and Abbotsford and pass on to the Longden Road *en route* for Nuwara Eliya. This is becoming a favorite route for bicyclists who think nothing of running from the Sanatarium to Talawakele or as far as Hatton (a Colombo visitor and Rangoon friend did the 32 miles 2,000 feet down, in 4 hours the other day); but who, though they enjoy a shady avenue for several miles, are far too much occupied in engineering sharp turns—of which unfortunately there are too many—or in giving "ample room and verge enough" to bullock bandies—to find proper opportunity of looking at the scenery, much less studying the vegetation. And yet there is a great deal in both worthy of note. We think it a pity that in his recent visit to Dikoya and Maskeliya, His Excellency the Governor did not drive down the Longden Road through Dimbula to Hatton, rather than travel by rail. Very likely, the drive is only reserved until the Dimbula district is properly honoured with a viceregal visit, on which occasion, we trust, all the main roads we have named will be traversed, and the district thereby properly appreciated. In some respects, there is no more delightful upcountry drive in the island than the one from Talawakele to Nuwara Eliya, or *vice versa*. There is mountain and river scenery—big falls, tumbling cataracts, smooth pools, and long reaches of shady stream—with diversified vegetation from the clumps of shrubby, yellow or giant bamboos, to the shady grevilleas, graceful acacias, and the towering gum trees—all breaking the monotony of tea fields dotted over, however, with cinchonas, and by the wayside with not a few coffee bushes, singly or in limited groves. Cultivated native fashion, but with the trees neatly trimmed, it has been quite a treat to see an appreciable number of coffee trees—not acres—on some of the plantations in blossom, bringing back recollections of the beautiful fields of snowy jessamine-like flower, to be succeeded by the plentiful ruddy cherries of "auld lang syne." Our higher districts, as a whole, are becoming wonderfully well-wooded—(an advantage which many estates short of firewood sadly need)—and this is especially the case in Upper Dimbula.

We suppose the experienced Manager of Mount Vernon is as favourable as ever he was to the grevilleas (the Queensland silky oak) dotted over his tea fields on account of the great benefit which their litter of leaves confers on the tea bushes, while the big trees in no other way do harm. The fertilizing material is indeed abundant, if we may judge by the roadside gatherings on Lorne and adjacent estates, where we were repeatedly reminded of Milton's line :—

> "Thick as autumnal leaves that strew the brooks
> In Vallambrosa."

The bamboos have no such beneficial effect; but they are confined chiefly to clumps on the riverside, though some fine collections are found higher up in the ravines. The timber offers compensation for the sometimes troublesome litter :—the smaller bamboos split up making useful palings or garden fences; the larger ones a capital substitute for spouting, with many other means of turning the different sizes to use. Nothing, however, can be more picturesque in early morning or afternoon sun, than the glancing yellow Ceylon, Nilgiris or Himalayas, or the dark dark green Java, bamboos by the riverside in contrast with the prevailing plantation cultivation. All four kinds of bamboo are found on Abbotsford, and we suppose, we may say without any exaggeration that Abbotsford—thanks to the enterprise and enthusiasm of our relative and chief, the late A. M. Ferguson—is the best "timbered" or "wooded" tea plantation in the island? There are, as we said, some coffee bushes left and a very appreciable quantity dotted over the tea fields, of cinchona trees—alas, of no value unless the demand and prices increase and justify continued cultivation and bark-harvesting;—but these are nothing to the number and variety of timber trees. No census has ever been taken; but the experienced Manager, Mr. Fraser—himself an arboreal enthusiast—thinks there cannot be fewer than a score of varieties of Eucalypts, from the gigantic *Pauciflora*, running to 100 feet high and 8 to 9 feet in circumference, to the jarrah and red gum or the

handsome swamp mahogany. Then among many other introductions, especially on Lower Abbotsford—there is a difference of about 1,500 feet altitude between the top and lowest part of the estate—there are notable, magnificent specimens of *Albizzia moluccana*, umbrageous, lofty, massive, like so many grand beech or elm trees, and although not more than 15 years old, yet measuring up to 9 or 10 feet in circumference. The contrast between the cockscomb-like yellow grevillea flowers and the feathery white flower of the albizzia is very delightful. Of other trees we may mention several varieties of casuarina, pinus, cryptomeria, toons and allies, and acacia, the *Melanoxylon* especially, of which there are also fine belts on Dessford estate. Of individual ornamental trees there is enough for a botanic garden. Then, again, in garden cultivation, we believe the esteemed Superintendent of Hakgala Gardens sometime ago would not credit what he was told was to be seen on Abbotsford in the shape of Palm trees. And it is certainly very interesting to see, at 5,000 feet altitude, palm trees (albeit Australian in habitat) which might be taken at first sight for palmyras, 50 to 60 or 70 feet high, flourishing so freely that their reproductiveness in young palms from the dropping seed is likely to become a nuisance to the gardener or planter!

Nor have we mentioned all the advantages which have been secured in Dimbula and adjacent districts from the planting of timber, fuel or ornamental trees amidst the tea, in the gardens or in separate groves. "The songsters of the grove" have, as might be expected, very freely availed themselves of the cover and homes provided for them. "The singing of birds is again heard in the land"—heard over the 50,000 acres of primeval forest originally cleared to the last tree for coffee, cinchona or tea in this immense district. Not only so; but more bird visitors are finding their way up from the low country—attracted, no doubt, by the genial climate, garden-like culture, comfortable groves, and abundance of food. And here comes in the economic use of birds in destroying insect among other enemies of the planter and his staples. It has been an unusual and delightful treat to us at 5,000 feet to be wakened at sunrise by the multitudinous singing of birds outside our windows and away on the tree-tops, recalling the home cry in "Cymbeline":—

"Hark, hark! the lark at Heaven's gate sings,
And Phœbus 'gins arise."

For lark, read blackbird, as the chief favourite in Upper Dimbula and indeed in all our higher regions up to and within Nuwara Eliya itself. Indeed, the tree and garden cultivation in the higher districts have brought the birds—for who ever saw or heard them in the Dimbula jungle?—or even in the higher jungles now. The lowcountry sparrow is even now found in Dimbula. We trust the process of establishing groves of timber or fuel trees, or of dotting these over the landscape and of introducing ornamental trees into the gardens and around the bungalows, in our planting districts—both high and medium and in its own way even in low districts,—may continue and extend more and more; and then we may be sure that the risk of any serious enemy to our tea or other products, springing up, will be greatly lessened.

Meantime, we commend to all visitors and travellers—not to speak of residents who move about from time to time—the advantage of becoming acquainted with the scenic and other beauties of our higher planting districts—Dimbula, Dikoya, and Maskeliya, not to speak of Udapussellawa—even as seen from the first-class roads which traverse so many of them in different directions.

ENEMIES OF CACAO.

We call attention to an interesting letter from Mr. Vander Poorten, who has had prolonged experience now as a cultivator of cacao. He refers to the letter in which Mr. Christie announced that the Governor had considerately agreed to call in a Specialist to report on the pest affecting the red species of cacao. No intimation is given as to where this Specialist is to be sought, and whether he is to be an Entomologist or Fungologist? We do not know, indeed, whether there has been a preliminary local enquiry, and whether such special talent and training as we may have in our midst has been consulted—or whether the Governor is acting, or has acted, simply on the request of the Planters' Association Committee, or of Mr. Christie as spokesman for a number of cacao planters? We ask these questions, because apart from the letter we publish today—the writer of which shows practical and scientific knowledge—we cannot find that Mr. E. E. Green of Pundaluoya has been consulted as to the "Specialist" required for "the cacao pest." Now, we know, a prophet is not without honour save in his own country; but seeing that Mr. Green has made for himself no undistinguished position among scientists at home, and remembering further that we have had in the course of the past thirty years, "specialists" come out to this colony, who proved decidedly bad bargains,—we should certainly have liked to see Mr. Green, as well as the Director of the Botanic Gardens, consulted as to the wise and proper course to be taken in the matter. Mr. Green himself, being the most modest of scientists, will deprecate what we have written; for, in answer to our enquiry, as to his knowlege of cacao enemies, he writes as follows:—

"From Mr. T. N. Christie's letter it appears that the specialist is required to investigate some one particular pest affecting the red variety of the cocoa I am not quite sure to what disease he is referring. But if, as I suspect, it is of a fungoid nature, the services of a specialist (a cryptoganist) would certainly be necessary. I am certainly not qualified to advise in such a case. My particular studies have been entirely in the entomological line. Some few weeks ago Mr. Chas. Gibbon sent me some sections of diseased cocoa steens, together with some small boring beetles which he supposed to be the cause of the trouble. But an examination of the material showed me that the beetles were not accountable for the disease, but had been attracted by the decaying wood. The whole sap of the tree was diseased. I was unable to say whether the inquiry was due to unsuitable soil or to some fungoid disease; but it was certainly not caused by any insect enemy.

"Many thanks for your kind expressions of opinion upon my qualifications as an economic entomologist. It is a subject that has always interested me, and I have endeavoured to keep myself abreast of the progress and work done in this direction in other countries. But it is difficult for a private individual, unsupported by either funds or authority, to conduct the necessary experiments. Many of these—though expensive—must be unremunerative. We have very much to learn about the action of various insecticides and there can be no progress without many failures, for which a large margin should be allowed."

We most heartily agree in the need of economic experiments in reference to the enemies of more than one of our staples, and we cannot at all understand why, before importing a Specialist (even though a Cryptogamist or Fungologist) advantage should not be taken by Government of Mr. Green's special qualifications to get him to visit the different cacao districts or estates afflicted with enemies and to report on the same. Mr. Green can be depended on to give an honest, as well as useful Report, and in the case of "Tomici perforans" as described by Mr. Vander Poorten, it is possible an enemy has to be dealt with that is peculiarly within the scope of Mr. Green's department, and yet which apparently produces results as serious as any arising from a fungoid enemy? It must be understood that we are not in the least opposed to a "Specialist" being got to deal with any disease outside the scope of Mr. Green's training after the necessity for the same is clearly shown; but we cannot help thinking an inspection and Report from the latter to Government ought to precede the importation—such Report probably indicating with scientific exactness what was really expected of the new-comer.

Still more, we have to point out for the information of Government that if a fungoid enemy is the trouble of the planters of red cacao, the proper course is, first, to send specimens of the fungus to the leading European authorities to identify, describe and possibly to tell us all that is known of its work elsewhere. We are able to assure the Government that this is what was done by the late Dr. Thwaites in reference to the coffee fungus: at the very outset he sent specimens to Messrs. Berkley and Cooke, the greatest living fungologists, who pronounced our great coffee enemy to be new to science, named it *Hemileia vastatrix* and recommended that its life history should be worked out. It was only *then*, that Professor Marshall Ward was got out as a Specialist, to study the fungus in its habitat and frame its life history, as he so successfully accomplished. Surely the same course is the wise one to follow now? It is, moreover, very unlikely that the cacao fungus should prove "new to science" and more probable that we should be told a great deal about it if specimens were sent to the proper quarter; for this reason, among others, that Dutch and German scientists have been investigating the "Enemies of Cacao" for many years with reference both to Java and Dutch Guiana.

LIBERIAN COFFEE IN SUMATRA.

We are glad to learn that Mr. Turing Mackenzie has returned to Sumatra with sufficient support from Ceylon to enable him to develope his valuable land concession for Liberian coffee, etc.

INDIARUBBER *Vs.* GUTTAPERCHA.

As is well-known, both India rubber (in small quantities) and Gutta percha (largely, are produced in B. N. Borneo, and those products are amongst the most important of the districts which the new railway is designed to tap. Apropos of this the following definitions of the difference between the two gums may be of interest:—"India rubber is of a soft, gummy nature, not very tenacious, astonishingly elastic. Gutta percha is fibrous, extremely tenacious, and without much elasticity or flexibility. India rubber once reduced to a liquid state by heat, appears like tar, and is unfit for further use. Gutta-percha may be melted and cooled any number of times without injury for future manufacture. India-rubber coming in contact with oily or fatty substances is soon decomposed and ruined. Gutta-percha is not decomposed by coming in contact with oily or fatty substances. India-rubber is ruined by coming in contact with sulphuric, muriatic, and other acids. Gutta-percha resists the action of these and nearly all acids. India-rubber is a conductor of heat, cold and electricity. Gutta-percha is a nonconductor of heat, cold, and electricity."—*N. B. Herald.*

PLANTING IN THE WYNAAD.

WE call attention to a rather important advertisement (p. 409) sent us by a well-known experienced Wynaad planter, whose testimonials, as to practical ability and reputation, are of the most satisfactory description. Mr. Ryan not only reports first-class land to be freely and very cheaply available on leases of 12, 24, 48, or 99 years, and low Government assessments (not exceeding two rupees per annum on the *cultivated* acre); but he adds that "labour is cheap and plentiful"; and also an abundant supply of manure. All this should induce a rush of commissions to Mr. Ryan, and it indicates the prospect of Wynaad becoming an important competitor in respect of medium and common teas. But it will take some years yet, before it can come to the front to a serious extent.

AGRICULTURE IN CEYLON AND THE NUWARA ELIYA AGRI-HORTICULTURAL SHOW.

We direct attention to a discriminating notice of the recent Show, from a competent hand on another page. To say that such Exhibitions are of no use to natives as well as colonists—as a contemporary seems to have done—is to our mind, the very acme of blind prejudice or obstinate unbelief in the progress which every year witnesses around us. This action is on a par with quoting Mr. Coomaraswamy of all men as an authority on native agriculture! We suppose the same writer, if he lived in the "twenties" or "thirties," would have said it was of no use introducing potatoes into our hill-country, since the natives would never grow them. Or, no use for Mr. Nock to show his new vegetables at successive Shows, during the past twelve years, as nobody cared about them—while the fact is that natives by hundreds, if not thousands, have profited by his recent introductions from the West Indies, brought before many of them first as exhibits at Shows; while as regards "potatoes," "cabbages," and other ordinary English vegetables, who can say how much benefit has been conferred on the natives of Uva, Udapussellawa, Matnrata, Ramboda, and other districts and the Tamil coolies throughout the planting region—by their gradual introduction from the "twenties" downwards. No better way again can be devised of bringing any new, or specially improved vegetable, fruit or other agricultural introduction before the general public—natives especially—than in Agri-Horticultural Shows. Not simply "society," or the well-dressed crowd of all classes, who pay for admission, take note of the exhibits. They are the talk of the bazaar, of the *hoi polloi*, who

crowd around the enclosure to get in at the end, of the many coolies who take an interest in master's "exhibits," prizes or misfortune, and altogether it is difficult to tell even in this somnolent land, how far the benefit of such Shows may extend among the people around us. Of course, we plead, in regard to more strictly native rural districts, for Exhibitions on a less imposing scale and more suited to the condition of the people.

In this connection we may refer again to the practical address of His Excellency the Governor at the Nuwara Eliya Show. We have generally been accused of giving too much attention to planting and agriculture in one form or other, and the series of volumes of our *Tropical Agriculturist* are evidence that we have not failed to do our duty by the land we live in or indeed by tropical lands generally. The *Agricultural School Magazine*, issued independently, as well as bound up with our monthly, deals more particularly with practical subjects within the scope of native readers, and let it never be forgotten that the Ceylonese are far and away in advance of Indian Agriculturists in their knowledge of English. We have again and again found native gentlemen making experiments with new products, or in improving old, through the guidance afforded them by their English reading in local or other publications. It is rather extraordinary to us that the Governor should be puzzled about the usefulness of an Agricultural School or College in Ceylon, seeing that His Excellency must know how highly favoured such institutions are by the Governments and experienced officials in India, where, there cannot be more scope or intelligence among the people that is freely available in Ceylon. Surely this island can afford and ought to have an Agricultural College as much as Madras? Here then is what is doing over the way according to the latest Madras papers :—

The Agricultural College.—The practical examination in Veterinary Science, Botany, Agriculture, Surveying and Levelling commenced on Friday, and was continued till Saturday. The examinations will be resumed on the 15th and be continued up to the 20th proximo, and will be followed up with the Theoretical examinations in the same subjects up to the end of April next, when the College will close for the summer recess.

If Sir West Ridgeway is therefore in any doubt as to how the local School or College should be conducted, can His Excellency do better than compare what has been done here with the course pursued in Madras? We earnestly desire that Conferences could be arranged between Indian and Ceylon officers in many departments of the public service—in the Police, Railway, the Postal-Telegraph, the Survey, P. W. D., Botanic Gardens, Technical and Agricultural Schools, to name only a few, and even without troubling the Revenue and Judicial branches. Only good could result from meeting for a fortnight or month once in two or three years to compare modes of working and results. That would certainly be a most practical way of improving local administration. In the meantime let us see what the Governor's Commission on the Agricultural School, is to bring forth. Who are its members and whom are they to examine? Should not one of the Commissioners be sent over to watch the present examinations, and generally to study the Madras Agricultural establishment and procedure?

COOLIES—COOLIES—COOLIES!

Is likely to be a cry often heard in the present and coming two months. Mr. Ingramcotton, it will be observed, gives the Planters' Association exactly the information and advice we tendered sometime ago, namely that Bellary, Cuddapah and North Arcot (among Tamils and Telugus) are the only promising districts for an extra supply of coolies. The Immigration Agent should, at once, be deputed by Government to visit and report on these districts.

In our own planting districts, matters are rapidly coming to a head. A careful planter, not 100 miles from Kotagala, writes :—

"Crimping is of daily occurrence: kanganis go about and find out where they can get the highest advances and then give notice."

A merchant again sends us evidence of the extraordinary rates per head, leading proprietary planters, are prepared to pay for coolies; not far off R100 a head apparently. We are aware that planters who have never before been troubled about tundus, are worried this season. But how is it, on the other hand, that there *are* estates (in the older districts especially) on which advances have never been given or asked for? Is it on account of garden and other special privileges? If so should not something be done in this direction in other districts to keep Ramasami more "at home" and contented: how would it do to multiply boutiques—so that kanganis and coolies need not wander to the big central bazaars to hear all "the scandal" and to get tempted?

DOGS AND JACKALS.

On a coconut plantation near Hanwella are two ordinary village watch-dogs. They are fond of hunting on their own account and have been known more than once to bring down and kill a jackal, probably when it was prowling about their master's fowlyard. Is this unusual?

VARIOUS PLANTING NOTES.

Ceylon Tea Exports.—We learn on the usual authority that the total shipments for March from Colombo equalled 9,125,000 lb; while the estimate for April is 9½ to 10 millions lb.

Cinchona Prospects.—We referred to these the other day as so poor that few planters in Ceylon cared even to allow their old trees to continue in existence. But here is a rather more reassuring report from the latest London *Chemist and Druggist*:—

Cinchona.—Since the last Amsterdam auctions several parcels have been sold privately at full prices. There has also been more demand for *Druggist* quill. In the Amsterdam market the opinions about cinchona bark are very conflicting, but the majority believe in a lasting improvement on account of tho decreased receipts from Java, which, they maintain, will continue to dwindle. On the other hand there is also a party who say that the shipments are only kept down for a time, and that we shall be swamped again shortly; this, however is the minority, and the feeling generally has improved of late. The April auction will be a large one, about 6,000 bales, but still, if the March shipments are small (and this will be made known before the sale), a good result is expected. It is said that the German factories are working day and night to keep pace with the orders in hand, which clashes with tho supposed existence of enormous stocks in their hands, about which they are always talking. At all events the consumption of quinine seems to have been enormous.

COCONUT PLANTING AT VETTUKKADU, JAFFNA.

Vettukkadu is a village of the Division of Punaryn, which is one of the Maniagarships into which the District of Jaffna is divided. It is about 12 miles by sea from Jaffna. About fifteen years ago, Dr. Candiah of the Civil Medical Department, now a pensioner, bought a piece of Crown land and planted it with coconuts with the result that he now gets a fair return for the money and labour expended. The example thus set has induced other Jaffnese to take to coconut planting in and about Vettukkadu. Some years ago, Mr. Casipillai of the local Bar, purchased an extent of Crown land, larger, I believe, than Dr. Candiah's and commenced planting. The estate formed is now under careful and systematic cultivation. It will come into full bearing a few years hence and there is every prospect of its proving to be a profitable investment. More recently, about 600 acres were purchased by a number of Jaffnese, who have already cleared about two-thirds of the extent. The planting of a portion of this extent, undertaken only last year, promises well, judging from the appearance of the plants. Reference was made in your columns some time last year to the land bought by Mr. Bastiampillai of the Fiscal's office, Batticaloa, who had the pluck and sagacity to send a gang of Moormen under Mohammadu Ibrahim Kandu of Eravur. The Moorman, who took the work on contract, fulfilled it to the satisfaction of Mr. Bastiampillai, who now finds that he has had to spend less for clearing than the owners of adjoining lands.

It may be of interest to state what I have observed on a recent visit to Vettukkadu, that there is a considerable acreage of crown land to the south, east and west of the new clearings, quite as good, if not better, for purposes of coconut planting. The water is good, being found within a depth of 7 feet from the surface, even in the driest season—a point of great importance to the cultivator of the coconut which requires regular watering for a number of years.

The soil of Vettukkadu is regarded as specially adapted for coconut cultivation. The proximity of the village to Jaffna and the facility of communication by sea between the two places are recommendations which cannot be overlooked. The carriage of produce by carts from the estates along the central road as far as Elephant Pass is expensive. Vettukkadu is easily reached by boats and the transmission of produce from there must be comparatively cheap. Just as I am writing, a friend furnishes me with the information, which he avers to be true, that applications have been made by natives of Jaffna for about 200 acres of land to the south of the new clearings. I, for one, will not be surprised, if before long, the whole of that neck-shaped stretch of land known as Vettukkadu becomes one vast expanse of coconut groves.—*Cor.*, "Jaffna Catholic Guardian," March 27.

COCONUT OIL IN AMERICA: DUTY DEMANDED.

The Eldorado Linseed Oil Works of San Francisco have filed a protest with the Committee, urging that a tariff of 2 cents per pound be imposed on coconut oil as follows:—"As we are conducting a prominent industry, which is of great importance to the Pacific coast, and for which we seek protection under the proposed tariff bill, we write you. We are engaged largely in the manufacture of coconut oil, and our factory is situated in West Berkeley, on the shores of the bay, where we give employment to a number of hands. This oil, under the present tariff, is free of duty, and is largely imported from India and the East Indies into the ports of the Atlantic seaboard. The raw material from which this oil is expressed is the coconut grown in the South Sea Islands and brought here in a dried state, commonly known as copra. This business in which we are engaged is capable of great expansion were it not for the severe competition which we were obliged to meet from the imported oil, made by Indian labor. Under the early tariffs a duty of 10 per cent was imposed on the imported oil, but subsequently this duty was removed, the oil being classified as a nut oil, and entered free of duty. The oil is largely used in the manufacture of soap througho ut the United States, and were sufficient protection afforded the industry we could make enough to supply the United States, and this protection would simply counteract the additional freight which we are obliged to pay for transportation to the Eastern markets. In fostering this industry you would be building up the commerce of the Pacific coast, inasmuch as the South Sea Island would furnish us with copra, taking, to a great extene our products in exchange, a trade which is now going to Germany, and which could thus be diverted to our shores. We address you this merely as preliminary, and would like your suggestions as to what steps should be taken, or, if you are willing to interest yourself in the matter, we will furnish you with sufficient data to fortify the position and make your demands appear reasonable. We believe that a duty of at least 2 cents per pound should be imposed on this article."—*New York Oil Reporter*, March 1.

BRAZIL COFFEE NOTES.

We are glad to hear that the coffee plantations in Jujuy are giving splendid results, and so next year the fruit will be cultivated on a large scale in the northern provinces.—*Sport and Pastime*, Buenos Aires.

Some of the prominent planters in the northern districts of Sao Paulo, those served by the Paulista and Mogyana railways, will be much diminished. The reports from the new districts in the southern part of the state, those served by the Sorocabana railway, are stil highly favorable.—*Rio News.*

ARNTULLY ESTATE, JAMAICA.

This was the property of the late Mr. Wm. Sabonadiere. We now read in the *Colonies and India*:—

The future resident of Arntully Estate, Jamaica will be Mr. Hubert E. Eves, a son of Mr. C. Washington Eves, C.M.G., who recently left England, accompanied by his wife and family, for their new home. This is a further instance of the interest which Mr. Washington Eves takes in the island, and it is hoped that the property which Mr. Hubert Eves is now taking over may prove in every way successful, and become one of the best coffee estates in the island.

RUBBER PLANTATIONS.

The cycling world will soon look with interest to "the Major's" advent at Lagos as a stimulus to increase rubber production. Surely the Straits might make a big move in this direction. A home paper says:—

The marvellously quick development of the india-rubber industry at Lagos will, no doubt, incite other tropical portions of the Empire to emulation. In the course of a single year the exports of this commodity from Lagos increased from 5,867 lb. to 5,069,576 lb., a growth of trade probably without parallel. But the natives who obtain the rubber in the forests employ such wasteful and destructive methods of "tapping" that the supply is sure to dwindle away, as has hap-

pened through the same cause on the upper waters of the Amazon. If, then, this young and most profitable industry is to become a permanent source for wealth, whether at Lagos or elsewhere, some methods of insuring constancy of supply must be adopted. There are no ways by which that might be accomplished. The rubber-producing forests could be leased on such conditions as would give the lessees personal interest in preventing destructive "tapping." Or, better still, as not confiscating native rights of free search, plantations might be established at suitable places. Once the trees reached maturity, they would continue to yield the precious juice for many years, if properly treated. Before science turned its attention to the matter, the invariable practice was to bleed a tree to death, and it is that barbarous method which still obtains at Lagos. But by a new and improved process, sufficient vitality is left in a "tapped" tree for complete recovery and future fruitfulness. There seems to be no reason, then, why rubber plantations should not make as profitable investments as tea or cinchona gardens.—*S. F. Press*, March 22.

EXTENSIVE PURCHASE OF GALLNUTS.

The Government Agent of the Province of Uva, Badulla, notified that he would receive offers for the purchase of 20,000 bushels, more or less first class aralu nuts on or before April 15th. We quote as follows from a paper by Mr. J. W. Modder, in the latest *Ceylon Forester*:—

The tree is most familiarly known all over the Island by its Sinhalese name of "Aralu-gaha." In Tamil it is called the "Kadaki-maram."

In commerce they are known as Chebulic myrobalans and are largely exported to Europe from India and even Ceylon. In the Southern Circle of Bombay the Forest Department is said to clear annually a nett profit of a lakh of Rupees by the sale of these fruits alone. The average annual export from Ceylon is valued at about R22,700 and very nearly the whole of this quantity is gathered in the Province of Uva. It is said that the Ceylon nuts are equal to the best Indian Myrobalans.

Uses of the fruits: The fruits are used for dyeing, tanning and medicine. Mixed with alum they give a yellow dye, and with iron clay a superior kind of ink. An oil is extracted from the kernel. Fruits which are over burnt or badly eaten by white ants and unfit for any other purpose when pounded and mixed with mortar strengthens the latter immensely. This addition is generally made to the mortar used for the foundations of large and valuable buildings.

Gall nuts bring the largest revenue under the head of "minor Forest produce" to the Department and there is no reason why the receipts under this head should not be still further increased by judicious treatment of these Forests departmentally with a view to improving the condition of the existing trees and assisting reproduction. The renters pay R3,500 on an average a year for the right to gather the nuts and make a large profit over the transaction, and there is no reason why the Department should not work the Gall Nut Forest profitably. Areas which yield gall nuts in the Uva, Eastern and Sabaragamuwa Provinces can be reserved and worked by a special staff.

PRODUCE AND PLANTING.

IN PRAISE OF ASSAM.—In the last *La Revue de Paris* Prince Henri of Orleans describes the final stage of his Mekong exploration, and in doing so he record some interesting facts concerning Assam tea-growing. He points out to his countrymen that there were three years ago close on 300,000 acres covered with tea-plants. This enormous tract of land was divided into 823 estates, employing regularly 300,000 labourers, as well as a floating population of 100,000 who are called in when necessary. The French Prince was exceedingly struck by the prosperity of Assam. He visited a number of tea plantations, and pays a tribute to the sense and good management with which they were conducted. He points out, and we hope that he is correct, that each superintendent is paid somewhat over a thousand a year, and two coolies are supposed to be able to look after one acre while the plant is actually growing. He goes on to say that the gathering of the leaves takes place during six months of the year—from March to September —and in good years an acre can yield as much as nine hundred pounds of tea in twelve months. He warns those who are thinking of turning their attention to Assam tea planting that a considerable capital is required, for a tea plantation can only be said really to pay after three or four years of incessant labour. With reference to the labour questions which seems to have puzzled Prince Henry a little, he points out that the existing state of things in Assam seems to suit the people, and he dwells on, the advantages of the hospitals and schools.

USEFUL KNOWLEDGE—Mr. Christison is doing very useful work in the interests of tea by continuing his lectures on Indian tea and its manufacturer in various parts of the country. Lecturing at Watford last week Mr. Christison gave his audience some interesting facts about Indian tea cultivation. He said in India there were in 1894 423,000 acres under tea cultivation, as against 305,000 in 1895 in Ceylon; and there were in other parts of the British Empire small pieces, bringing up the total area under cultivation in the Empire at the present time to probably 770,000 acres.

MAKING THE MOST OF IT.—In a handbill issued by a Glasgow firm of tea dealers the advertisers endeavour to score off the tea duty question. They say:—"It should be kept in mind that every pound weight of tea is charged with an Imperial tax (or duty) of 4d. Therefore, if you buy a pound of tea for 1s, you are paying 8d for tea, whilst the remaining 4d goes to the Imperial Government. If you pay 2s for your pound of tea, your contribution in the form of taxation is still only 4d, and you will get, if you deal with an honest firm, the full value of the remaining 1s 8d in tea of fine quality. We sell pure common tea at 1s per lb. (wonderful value for the money), because some people will have it, but we advise our customers to go in for quality, which is, after all, the true test of cheapness."

COFFEE CULTIVATION.—An effort is being made in India to stir up increasing interest in coffee cultivation, and the coffee planters of Southern India are urged to form an association at home for pushing the sale of coffee, and, in fact, to follow the example of those who represent the Indian and Ceylon tea industry, We have in previous issues pointed out the course which, in our opinion, would be likely to prove useful if a special move is to be made in Indian coffee, and we have also endeavured to show some of the main difficulties in the way. Meantime, coffee cultivation generally is on the increase, and in British Central Africa alone rapid strides are being made. In 1891 the first few sacks were sent to the London market, and favourably reported on. In 1895 nearly 170 tons were exported, last year the total rose to 300 tons, and this year it is expected that there will be at least 600 tons. It is estimated that at the end of the century the export of coffee from the Shire highlands will amount to 2,000 tons, and the planters are agitating for the construction of a railway from Chiromo to Blantyre, in order to obviate the present difficulties of transport.

THE POSITION OF COCOA.—The advance in the price of cocoa from the lowest point in November last to the present date in Mincing Lane quotations has been about 6s to 10s per cwt., chiefly on the common and middling qualities of Jamaica, Grenada, Trinidad, other British West India, African, and San Domingo,

Excepting those of Ceylon and Caracas, few or none of the finest growths now show any improvement in value, and cocoa between 54s and 64s remains at nearly the old level of depression. Before the recent rise took place, says the *Grocer*, cocoa was cheaper than it had been for five-and-twenty years previously, and though it may not become still dearer in a hurry, it is the generally received opinion that it can hardly undergo the severe depreciation it did in the past year. Descriptions which were next to unsaleable at from 35s to 45s per cwt are now worth 41s to 52s, and low defective grades that were disposable only at 25s to 32s have recently fetched 36s to 42s. The advancing market which has been witnessed this year so far is mainly accounted for by the constantly active demand for exportation to Germany, where the consumption has increased by 50 per cent, within the last year or two. The Germans prefer cocoa to coffee, esteeming the former to be the more nutritious article for their use, and as the commoner qualities have been best suited to their requirements, anything below a certain figure has been sure of finding a ready sale. Our export trade in cocoa with Germany has therefore been materially enlarged, and though no detailed official statistics are published, it may be calculated that the amount of cocoa shipped from the United Kingdom to that country is now twice what it was in 1896. Another favourable feature for holders is that the landings of cocoa in London since the opening of 1897 have been lighter than in 1896, comprising no more than 48,300 bags, in lieu of 50,600 bags; while the stock in the bonded warehouses, instead of being excessive, as hitherto, is 14,800 bags less than that in the former year.

The Rubber Forests of Upper Burma.—The Assistant Conservator of Forests in Burma, Mr. H. N. Thompson, devotes a section of his last report to the rubber production of Upper Burma. It appears that in the Hukong valley the rubber tree is not a gregarious one; sometimes a family group of four or five trees may be seen, but as a rule a mature tree is found every 200 or 300 yards in the richer forests. When the tree is surrounded by dense shade it grows to enormous heights in order to get at the light, and some of those examined by Mr. Thompson were the largest trees of any species he had ever seen. In the thick forest he found no seedling in the ground; they were invariably growing at a great height on other trees and sending their roots down towards the ground, so that the roots finally formed great supports on which the main trunk rested, while the original tree on which the seedling was a parasite was destroyed. The difficulties of transport from the Hukong valley is increasing as the more accessible trees are being worked out. A Chinese has a practical monopoly of the trade here. The rubber is taken to Mogaung, a route across the mountains to Myitkina having been abandoned owing to the exactions of the Sana Kachins. The forests at the head of the Namkong are rich in rubber, and the tree attains a height of 200 ft., with an enormous girth. The Kachins go from far and near to collect the rubber in the dry season, and the chiefs levy toll on the produce as it passes down the rivers. The Chinese control the trade, selling provisions and cloth to the Kachins, who pay in rubber. The produce of the forests within the drainage reaa of the Tarou River goes to Assam, across the passes of the Patkoi mountains. The Nagts, having got in their crops in December, set off for the rubber forests, where they know every tree, the knowledge being in many cases passed on from father to son. Rubber in this district is said to be growing scarcer, and it often takes a man forty days to collect a coolie load, although the Singpho villages levy a tax on each collector. When first collected the rubber is very pure, but the Nagas have acquired the trick of adulterating it with earth and stones, so that Assam rubber is not regarded with favour in the Calcutta market. The rubber that goes to Rangnoon is also adulterated, the Chinese being adepts in the art of concealing stones in it. Mr. Thompson thinks it useless to apply legislative protection and regulation to these rubber forests, unless the districts were taken over and administered directly, for the Singphos are extremely independent and own no masters while some of the chiefs told him they could not enforce rules or interfere with the collectors. But the protection of the trees growing within our own administrative sphere would be possible, though Kachin opposition would have to be dealt with.—*H. and C. Mail*, March 14.

B. CENTRAL AFRICAN CURRENT CHAT.

A good waggon road is in course of construction from Zomba to the Upper River. To be a good level road it is necessary to keep lower down than the old Domasi road. It will probably pass close to Songani plantation which will give this district a road all the way to Blantyre, that is allowing it is kept clean. It is little good making a road in this country, if it is allowed to take care of itself for the future.

A curious coincidence happened on Decr. 30th at Mr. Lloyds plantation. In 40 minutes it rained 41 of an inch when there was a pause. The rain then came on again for another 40 minutes the gauge registering exactly 41.

The question of growing coffee profitably in Natal is again being revived. A correspondent of the Natal Farmers Magazine remarks that trees which were diseased are now by proper treatment, healthy and full of fruit. Shelter seems to be the main point to consider.

We hear of some record planting at Gala estate, Namadsi, 130 acres has already been planted, and other 70 which was cleared last year is now being pitted. Graviliia Robusta will probably be planted as a shade tree.

We deeply regret to hear of the death of Mr. John L. Nicoll from dysentery.

It will interest our readers to hear that the Rev. Mr. Murray who was so severely wounded by a leopard at the station in Agoniland in the beginning of last year is at present in South Africa lecturing on Nyasaland Missions. He had to go to England to get his eye properly attended to and is not even yet in the most robust health. He and his wife may be expected back in April.

A syndicate has been formed in Southern Hungary for the purpose of laying down large castor-oil plantations.

Lemon and Lime trees make excellent hedges and are recommended by the Queensland Department of Agriculture.

Belgium sends 600,000 cwts. of chicory to France yearly.—*Central African Planter*, Feb. 1.

NYASA NEWS.

Mr. C. C. Bowring has given us the following notes of a recent journey up Lake Nyasa:—

"Going through Lake Malombe in the beginning of November, there was not a hippo to be seen. Returning in the end of December, however, there were literally dozens at the south end, near Mvera. They appeared to be mostly young animals, and showed no fear of our barge. Two or three repeatedly rose within thirty or forty yards of us.

On Christmas, Capt. Rhodes and the staff of the naval department gave a dinner at the naval depot, Fort Johnston. The "Adventure," "Ilala," "Domira," and "Monteith" had left only a day or two before, or we should have been over thirty in number. Capt. Beddoes, who sailed down in the dhow from Fort Maguire, took only 22 hours on the passage. The dinner was followed by fireworks and a native dance, which was continued late in the following day.

At Kotakota a football match was played between the Universities' Mission and the gunboat "Pioneer." The Mission team gained an easy victory. Several Europeans played on each side, but the best player was undoubtedly one of the Mission teachers, who had been a prominent member of the native team at

Zanzibar, where he had frequently played against crews of the various men-of-war.

On the north-east shore of Lake Nyasa the high mountains come down sheer into the lake, which is here very deep, no bottom being found at 300 fathoms.

The German station at Langenburg is a very smart looking fort. It is built of brick, and is painted white. When we were there the garrison had just returned from an expedition against the Wahehe which had been very successfully carried out. The garrisons of the various stations had, at a given date, advanced on the Wahehe from different directions. They captured large quantities of cattle, sheep, and goats.

Fort Hill, the recently formed Administration station, is situated about seven miles from Mwiniwanda's stockaded village on the road. It has a good boma, and is pleasantly situated at a height of about 4,300 feet above the sea-level. Coffee has been planted, but it is too early yet to say how it will succeed. Coffee which was planted, however, some ten years ago at Chirenje Mission station, the site of which is within a few miles of Fort Hill, promised well, I am told, up to the time it was abandoned.

Ranyara, the B.S.A.Co.'s station is just over the boundary. While I was there we sat down six to dinner on St. Andrew's Night. Mr. Forbes had just returned from a trip round the Chambezi, where he had secured some fine heads of puku and roan antelope. Mr. Young had also arrived at the station, having been to Senga, where he was hospitably treated by the Arabs.".—*Central Africa Gazette*, February, 1, 1897.

CATERPILLARS AND TEA.

A Darjeeling correspondent writes us:—The caterpillar plague is fast spreading. On one garden here in about a week they caught and destroyed nearly 100,000. On one garden in Assam about 1,000 coolies are daily employed in destroying these pests. The weather here is now perfect. The March winds have died down, and we are having beautiful cloudless skies.—*Indian Planters' Gazette*, March 20.

NUWARA ELIYA AGRI-HORTICULTURAL SHOW.

(*By one present, and competent to criticise.*)

March 31, 1897.

Few people who have visited the Show at Nuwara Eliya can conscientiously deny that it was in almost every respect a great success, and that in some points it would have put many a European Show of the kind well to the shade. All the more redounds to the credit of its promoters, when it is considered the paucity of such undertakings in the island, and hence the difficulty in getting exhibitors generally to take as keen an interest in it as they otherwise would, everything as it were, being out of gear in the long lapse of time between these Shows. Still the number of entries was large, many having to be put down as "extra" when these could not conveniently come under the classes in the schedule. Yet it is somewhat surprising to hear, in a land like ours, where agriculture is the mainstay of the population, some amongst us—Europeans they are also—express a feeling of general dissatisfaction if not disappointment at the whole concern; even one of our leading newspapers is pessimistic enough to contend that such Shows cannot have any beneficent effect on the agricultural instincts of the natives. But that is an argument which will not receive the favour of many of us. There are some people, it must be admitted, in Ceylon as everywhere else, who would find their tastes more gratified at a *tableau vivant* or a boxing saloon than at a charming Exhibition of the most valuable and beautiful members of the vegetable kingdom, collected and brought together from different parts of the country:

> "To me the meanest flower that blows can give
> Thoughts that do often lie too deep for tears."

Such Exhibitions are, as a rule, the only opportunity many of us have of gaining any idea of what has been done, is being done, and yet remains to be done, by the agency of man in the way of *improving* fruits, flowers, and vegetables, as well as the livestock of the farm. It is impossible to realise the wonderful variety, the interest, the potentialities of new developments which still lie hidden in our soils, and nothing is better calculated to bring these out than the honest, open competition afforded by Shows to agriculturists and horticulturists alike, be they professional or amateur.

We have heard it remarked that the best feature of the Show at Nuwara Eliya was the unusually large number of exhibits in the (European) vegetable class; although vegetables, as well as fruits and flowers, indigenous to our own clime, were rather poorly represented. In the way of tropical fruits, a very interesting collection was that exhibited by the Royal Botanic Gardens, to which also the Show was indebted for a magnificent group of plants, covering an area of about 100 feet square, artistically arranged by Messrs. Nock and Macmillan, the gorgeous flowering plants therein being from Hakgalla Gardens, and the palms and foliage plants mainly from Peradeniya Gardens; but these, of course, were not for competition. The former Garden also sent for exhibition a choice selection of cut-flowers, as well as a selection of potato tubers, grown from seed imported from Sutton & Co., which were in themselves a worthy illustration of what can be done with good sorts by proper cultivation, even in a climate where spring eternal reigns.

In viewing the schedule and the exhibits generally, we were inclined to think that a few improvements in the arrangement of things were desired, and this, no doubt, will be considered on a future occasion. For instance, some of the judges, who really ought not to have seen the inside of the Show before the judging commenced, had actually to arrange the exhibits. All the judges had their work well cut out for them; but those in classes I to VIII., viz., Messrs. Willis, Nock, and Macmillan, had more than their share, being hard at it almost without a halt from 9 a.m. to 5 30 p.m.

RAMIE: HOW TO START A PLANTATION.

Those desirous of starting plantations of this valuable fibre-plant, so often alluded to in our columns, will find the following of interest. The Boyle Fibre Syndicate of London has obtained a concession of 5,000 acres from the Sultan of Johore. The soil is a loamy alluvial, clay subsoil, the annual rainfall is 97 inches spread over the whole year. A sketch of the system adopted will be of value:—

The method of cultivation is also a point upon which something requires to be said. The Government of France has expended much money upon the cultivation of ramie in Algeria, but while the production has been fairly satisfactory, it has been found necessary to reap the plants simultaneously over the whole area cultivated. In other words, the plants are treated as a crop. The prolific character of the plant, however, lends itself to a different treatment. By obtaining an estate of a suitable

size and laying it out on a definite plan, much better results can be obtained. If it be assumed that an estate of 1,200 acres be cleared—preferably near a navigable river for obvious reasons—at least 900 can be put under cultivation, the remainder being needed for roads and access paths. Dividing this into suitably sized blocks, they can be filled with young plants. These blocks are arranged and the plants propagated in continuous succession, so that by the time the last block is ready, the plants in the first are ready for cutting. When they are 18 in. high no further cultivation is needed, and the plants will continue to grow for an indefinite period if occasionally thinned out. The advantage of this course over the crop system is that, by the latter, ripe, overripe, and immature stalks are cut indiscriminately, thus preventing any possibility of uniformity in the stalks or fibre. By the block system, on the contrary, only the plants which have attained a given maturity are cut, so that it is reasonable to expect a more uniform quality of fibre, in addition to which the machinery required is less, as it is constantly working on a regular supply, instead of at periods, owing to the intermittance of the supply.

The fibre which it is desired to obtain is embedded in the green stalk in a mass of gum or viscous sap, which is surrounded by the bark. Hitherto it has been the custom to strip the dried stalks by hand and ship the material to this and other countries in the form of ribbons. When so dried there is surrounding the fibre a brittle bark and a quantity of dried gum or resinous matter, which is insoluble in water. Both these substances require removal, and it is this which has hitherto been the fatal stumbling block. The ramie which comes from China, and bears the name of "China grass," is partially prepared by hand, the bark having been removed and the gum to some extent. Although the amount of cleansing needed is reduced, there is still some wanted, as the adherent gum must be all removed before the material can be successfully worked.

From what has been said, it is clear that there are two substances requiring removal, the bark and gum. Although attempts have been made to effect the cleansing in one operation, the experience of the past, and with other fibres, shows that a division of the process gives the best result. Just as in the case of flax the operations of retting and scutching are necessary to its perfect cleansing, so with ramie the double operation is the most effective. The difficulty has been to determine two points, namely, how to deal with the stems, and the character of the machine which can effect the operation. It has been shown that in drying the loss of weight is very great, and in addition to that the hardening of the gum renders it more difficult to remove. By the time the fibre is extracted not more than 5 per cent. of the green weight is obtained. It is not, therefore, surprising that attempts have been made to deal with the stalks in a green state, which is at once the most rational and economical plan. Many decorticators have tried, and we have, from time to time, described them; but the matter is one which requires more than the invention of a machine—it needs an organisation to use the machine to the best advantage. Such a machine has, it is claimed, been invented by Mr. J. M. Macdonald, and an inspection of it proves it to be simple, easily handled, and capable of ready repair—three points which are of supreme importance when it is desired to deal with the material at its place of growth.

The system, it is proposed to adopt, is to lay the land out on the block system, as described, and to place in the centre of each large block a set of decorticators of the Macdonald type, one of which is sufficient to treat the produce of five acres. Tramways are arranged to take the product to the decorticators, and not more than 250 yards will have to be traversed by the coolie after cutting the stems before reaching the tramway. From 50 to 60 tons per acre of stems can be grown in a year, and each coolie can easily cut 6 cwt. of stems per day. It is intended that daily cuttings shall be made, so that only matured stems will be treated, thus ensuring a uniformity of material, which is at present absent. As the block attended to by each coolie is two acres in extent, the amount cut from it can be easily checked which will ensure each decorticator having sufficient work.

It is intended to treat the stems in their green state, first by decortication and then by immediately degumming. The advantage of this is two-fold. First, all the bark and stalks can be returned to the field in the form of ashes, as when dried they will be used for fuel. In this way the mineral nutrients are returned to the land, which, as we have seen, so freely gives them up. Second, the degumming takes place at a time when the gum is soft and fluid, thus enabling it to be removed by solvents of a weaker kind than are necessary when the stalks have dried. This is so obviously the right thing that it only requires saying that the risk of damage to the fibre will be much reduced. In the third place, the fibre will be shipped as cleaned filasse ready for use by the spinner at this side. Freight will thus be saved, the spinner will save the cost of preparation, and the land be enriched by those materials which are so beneficial to it and so useless to the manufacturer. It is estimated that the material in the form of degummed filasse will be placed in this country at a cost not exceeding £45 per ton, which leave a good profit to the grower.

The ideas on manuring are a little crude, *i.e.*, burning the waste products so as to return the minerals. In the same circular from which we have quoted, it is stated that an annual crop of 4 cwts. removes the following huge amounts of plant food :

			Contains. per cent	Stalks. per cent	Leaves. per cent
Nitrogen	370lb.	of which Bark X Fibre	15	29	55
Potash	252lb.	,, ,,	10	60	25
Ph. Acid	156lb.	,, ,,	..	..	...
Lime	758lb.	,, ,,	3	10	87

There is no doubt that the methods to be employed save a great deal of loss in mineral, but the *burning* will cause a total loss of the far more valuable and expensive nitrogen.

An analysis given of the ash of green plants revealed that Lime was present to the extent of 30·82 parts in every hundred, Potash 11·8 and Phosphoric Acid 7·29.

We may add that Mr. J. M. Macdonald, the Managing Director of the Syndicate, with whom we are in communication, intends to remain in the Straits until the first hundred tons of filasse (fibre ready for spinning) are dispatched to England. Mr. Macdonald has further very kindly stated that he is ready to send us information of the progress of the estate in due course for the benefit of our readers. His present address is "Poste Restante," Singapore.—*British North Borneo Herald*, March 1.

HIGH-GROWN TEA IN CEYLON IN 1887-1896.

The following report. by Mr. John Hughes, Agricultural Analyst, on a packet of Ceylon tea from a high-elevation garden, the tea of which he had analyzed ten years previously, ought to be interesting to planters :—

"I have been examining the tea you were so kind as to bring me the last time you called and have compared the results with the Pekoe Souchong sent in 1887 :—

	1887.	1896.
Water lost at 212° F	7.30	3.60
Soluble extract	37.90	37.40
Mineral matters or ash.. ..	5.43	4.76
Nitrogen	4.40	4.51

The water is much less in 1896, the tea probably having been much more perfectly dried. The amount of extract as the result of infusion with boiling water, which was allowed to stand 10 minutes, is remarkably similar to that of 1887 tea as also is the percentage of nitrogen. The quantity of ash, however, is notably less about ·75 in round numbers, and it is of a white appearance, rather than of the more usual *darker* color. I imagine, but I have not

tested it analytically, that the percentage of potash and phosphates in this white ash is rather less and, if so, it would suggest exhaustion of the soil in these ingredients. Anyhow it would be of advantage to institute some comparative determinations of the proportions of potash and phosphates in tea made at different times of the year with a view of ascertaining the variation caused by atmospheric influences and soil exhaustion.

"From the specimens of leaves opened by hot water, it would appear that the plucking of 1896 is decidedly *coarser*, and the flavour of the tea is, in my opinion, as a consequence, not equal to that of 1887."

This report indicates a direction in which the Analytical Chemist should be able to help the planter as to the constituents wanting in his soil which would ensure a tea approved in the market.

CEYLON TEA, COFFEE AND COCONUT OIL IN AMERICA.

AMERICAN papers by this mail have a good deal that is of interest to Ceylon producers. In the first place, the *New York Grocer* of the 3rd March extends the following cordial welcome to our Commissioner and hearty congratulations on the increased business in Ceylon teas : -

Mr. William Mackenzie, the Ceylon Tea Commissioner, arrived from London by the steamer "Lucania" a week ago, and is exceedingly gratified at the great—in fact, wonderful—increase in the sale of Ceylon and Indian teas in this country. Direct shipments from the island of Ceylon for 1897 are three times as great as in 1896. The work of Messrs. Mackenzie and Blechyden in bringing machine-made teas to the notice of the American public has been so wisely directed and persistently pushed that we do not wonder that these teas are becoming popular all over the United States, especially in the Eastern and Middle States.

Next we may give the weekly report on tea as follows :—

Invoice business continues to be very slow, and the general tone of the market is rather easy than otherwise. There has been a marked increase in the direct shipments of tea from India and Ceylon to the United States. The exports from Ceylon to America from January 1st to January 26th were 64,866 pounds, against 10,415 pounds for same time in 1896.

The imports of tea for the calendar year 1896 were 83,965,317 pounds, valued at $10,749,889, against in 1895, 97,883,061 pounds, valued at $13,319,334. It came from the following countries:

	1895—lb.	1896—lb.
United Kingdom ..	3,696,192	3,784,299
British North America ..	574,427	564,354
China	51,458,868	46,176,355
East Indies	1,007,675	1,448,808
Japan	39,914,508	29,793,133
Other Asia and Oceanica ..	1,206,712	2,143,874
Other countries	24,669	54,494
Total..	97,883,051	83,965,317

Today at noon the Montgomery Auction and Commission Company will sell 5,023 packages, including 263 packages India and Ceylon Pekoe—an unusually attractive assortment.

Then in the same paper we find a curious outburst affecting coffee :—

"WICKED JOURNALISM."—In the last issue of the *American Grocer* attention was called to the extreme sensationalism of certain newspapers. Since then we have had a glaring example of false—yes, deliberately wicked—statements calculated to foster prejudice, excite hatred, disrupt society, and destroy the integrity and power of its units. The New York *Journal* of Saturday last makes the following statement :—

Coffee.

Total output of coffee (lb.).............. 650,000,000
Amount controlled by Coffee Trust (comprising the Arbuckle Company, of this city ; the McLaughlin Mills, of Chicago, and the Woolson Spice Company, before the latter company was "acquired" by the Havemeyers) (lb.)................ 495,000,000
Profit of the Trust every year (at Mr. Arbuckle's figures of 1 cent a pound).... $4,950,000
Profit of the Trust every year (at Mr. Havemeyer's figures of 3 cents a pound).... $14,850,000

The above is evidently the work of one, whose estimates have for a purpose been made deliberately false.

COFFEE.—There never have been a Coffee Trust. The Arbuckles have been protected by United States patents and trade marks. Their distribution has not exceeded, if it has reached, 2,000 bags per day, or 95,000,000 pounds a year. Their importations at New York in 1896 were 757,091 bags. The total imports in 1896 were 630,000,000 pounds, and 642,000,000 pounds in 1895. This coffee is imported in a raw condition and loses about 16 per cent. in roasting, bringing the average yearly distribution for two years down to 534,000,000 pounds, distributed by 2,500 wholesale grocers and 220,000 retail storekeepers. A profit of 1 or 3 cents per pound is not extravagant, especially when it is a fact that coffee has been declining in price for two years, and has fallen 4 cents per pound within one year.

If the *Journal* believes that trusts are against public policy it will do better service for their overthrow by telling the truth, and thereby commanding respect for its statements.

And finally in an Oil Trade Journal there is a paragraph in connection with "Tariff Revision" which indicates a possible change that may affect our great native staple :—

COCONUT OIL.—R. Percy Keese, Brooklyn ; "I do not know if your attention has been called to the article of coconut oil as one upon which a moderate duty could be well placed. At present it is free. There are about 10,000 tons per annum imported. It is used in the manufacture of white soap, taking the place of our domestic oils and greases, for the reason that it has the capacity for holding more water in the manufacture. It is a low-priced artictle, being only about 5 cents per pound, and a duty of ½ cent per pound would practically yield $100,000 per year. It would not curtail the importation be particle, and therefore, the amount would nets a again to the revenue, and it would work no domestic upon any one, but would protect our hardship greases to some extent. I assume, of course, there will be a duty imposed on tallow."

ECHOES OF SCIENCE.

Chestnuts are an important article of food in France, more especially in the departments of Archdèche, Corsica, and Sardinia. The largest come from the Pyrenees. Roast chestnuts still hold 40 per cent of water, and boiled chestnuts 70 per cent, but dried chesnuts only 12 to 15 per cent. These contain as much nitrogen as wheat, and M. Balland, in a communication to the Académie des Sciences, Paris, think they might be used as a food for the Army,

A horticulturist of Southern France states that he can grow black and white grapes from the same vine. His method is to take two "sarments," or branches, one giving white, the other black, grapes, and rub the two ends together, then bind them lightly, before planting them in the ground. If this is carefully done, the vine will bear white and black, and even piebald grapes (half white, half-black) at the same time.—*Globe*.

JAVA COFFEE, TEA, RICE AND SPICES.

A general statement has been issued by the Rotterdam brokers concerning coffee tea, rice and spices during 1887 to 1896. This stateme affords many interesting particulars. The world's production of coffee fluctuated in the last ten years between 7 and 12½ million bags of 60 kilos. Of this quantity Java (overnment and private cultivation together) delivered from 0·4 to 1.1 million, to which about 100,000 bags are to be added from Padang and Celebes. The Palembang coffee, which is usually shipped to Singapore, is crtainly taken up under the head of British East India coffee It may thus be stated that the Dutch East Indies. provide for about ten per cent of the wants of the world's consumption. It is striking that the Java production does not increase. The decrease of the Government's cultivation is a known fact, but it is another case as it concerns the private cultivation. In view of the numerous concessions granted a doubling of the production might have been expected. This has, however, not occurred, as the production of 1895-96 was nearly equal to that of 1886-87. The disease of the leaves must be regarded as a great factor in the small outturn. The imports of rice in Holland varied from 1887 to 1897 between 100,000 to 130,000 bags, of which Java had about the tenth part. The import of tea in Holland increased considerably, being in 1887-91 140,000 chests of 40 kilos., against 170,000 chests in 1892-96. In the former period Java tea represented the smallest portion, but in the latter this kind predominated. In 1896 there were against 68,300 chests China tea 102,000 chests Java tea. A considerable portion was again exported; but the consumption in 1896 amounted to respectively 41,500 and 30,200 chests. The consumption of China tea decreased gradually in this country, and Java tea increased. Five years ago the consumption was 50.300 and 15,500 chests respectively. This proves that the Java tea is more and more liked on the Dutch market and has, in fact, a good future.—*L. and C. Express*, March 12.

PLANTING IN MYSORE.

From the Proceedings (just received) of the Annual General Meeting of the South Mysore Planters' Association we quote the following:—

FAMINE.—In this province I rejoice to say that grain crops have on the whole been better than could at one time have been reasonably hoped for, an exceptionally heavy fall of rain in late November having saved a considerable portion of the dry crops.

THE PLAGUE.—If this terrible pestilence should make its way into this province and into Mangalore and its neighbourhood, our labour supply will be very seriously affected. I trust the authorities in the latter place, bearing in mind the large quantities of coolies that come up to Mysore from S. Canara, will take such measures as are possible to prevent the spread of the disease.

LABOUR.—The supply has been more plentiful than for some years past, and I agree with the gentlemen who wrote from North Mysore that an opportunity is occurring to check the upward tendency of advances. Ghauts especially have come up in increasing numbers, but Tamil labour having proved generally unsatisfactory and untrustworth, has been less employed.

RAILWAYS.—It is gratifying to observe the forward policy of the Dewan with regard to Railways. He is fully aware of the immense advantages accruing from opening up the country, and is encouraged in his views by the increasing returns on the lines already existing in the province. The branch line from Shimoga to Birur is being made, and the Durbar have expressed a wish to construct a line between Arsikiri and Hassan at their own expense and have submitted proposals to the Government of India regarding it.

CARDAMOMS.—Crops this season were very short and high prices have ruled. The Revenue Supt. has not as yet issued his report regarding the re-assessment. though it is now more than a year since he was deputed to make the enquiry.

"Coffee-stealing" is still a great grievance with our Mysore neighbours.

THE TEA TRADE OF CHINA.

One of our Chinese tea buyers made the somewhat astonishing statement (in Ceylon) that the use of machinery made no alteration whatever in the flavour of China tea. Experiments in this direction have so far been too limited to justify such a dictum, and the interviewed one was probably unaware that only a few years ago, with some simple machinery, a China tea was—by Mr Pinches, an Indian planter on a visit to China—prepared in the Indian way, sent to Calcutta to be reported upon, and there valued by the brokers, who knew not whence it came, as a very high grade Indian tea. In more recent days the Foochow Tea Improvement Company (a small company with a high-sounding title, but with earnest men connected with it) have shown that, *if desirable*, the China flavour, once so dear to English palates, can be eliminated, and this before they have erected machinery of any kind, and merely by making some trifling alteration in the manipulation of the leaf in its earliest stages of fermentation—in fact, without any amended cultivation and without any patent rolling and firing machines. Until far more extended experiments have been made in China as to what can and what cannot be done with altered methods of cultivation and the introduction of machinery the "Times of Ceylon" is a little adrift in stating that under no circumstances can Ceylon-flavoured tea be produced in China. It is true that some of the existing tea districts in China are worn out and incapable of producing either a good or profitable tea under any circumstances, but at the same time it must be borne in mind that China is a large country, and that she probably contains as many square miles of suitable virgin tea lands as there are square acres of such in Ceylon. That, in the present benighted state of affairs, China can continue her tea trade at all is an open question. With likin and duty on their present scale it is more than doubtful that she can do so. With these two factors eliminated, in ten years she would probably be the sole tea-producing country in the world, as she once was even in the memory of man, and our good friends in Ceylon would do well to bear this in mind. There are many changes being wrought in China: those who guide her destinies may, even sooner than is generally anticipated, assist rather than athwart what ought to be her really most important industry, and then let other tea-producing countries look to themselves. If the Chinese Government saw fit to treat the tea industry of China as the British Government treats the tea industry of India and Ceylon she would actually collect more revenue; and by bringing money and imports into what are now semi-starved or half-depopulated districts, check the seeds of a rebellion that will result in her elimination as an Empire. China's statesmen are alive to the fact at last, and they may possibly take such prompt measure to save her tea trade as will give the "Times of Ceylon" something more to think of than the detail fact as to whether the precise flavour that they obtain on their teas in Ceylon can be imitated in China. Experts would probably advise China not to alter the flavour of her teas in imitation of Ceylon—the product of that island is doing for England what absinthe has done for France, so far as the health and physique of the population is concerned: pure China tea always was and always will be a wholesome beverage. No one can advance the same in reference to Ceylons. The point that China has to look to is that Ceylon tea is a cheap beverage, and China tea a comparatively dear one. Take off duty, likin,

abolish steamer conferences, allow free use of machinery, fix a modest price for Government lands, and China will put a better and cheaper tea in London than ever Ceylon has done, and also her population will be the richer and increase their import buying power by very many millions of taels.—*China Mail*, March 25.

MINOR PRODUCTS.

It may at first sight seem inopportune to discuss minor agricultural products or at any rate to press them on the attention of capitalists and investors, at a time when tea is doing so much for the Colony, and when our own columns testify to efforts to further develop the great industry with which the prosperity of the island is closely interwoven. It has, however, been our endeavour always to discourage the setting of all our eggs in one basket; and this for reasons not wholly confined to the paramount consideration of supply and demand. The cry of over-production almost always follows large profits derived from any great enterprise, and not least from any great agricultural enterprise; but it is not the sensitiveness of the market alone which should influence producers. The greater liability to disease of large expanses of one cultivation—and, if not the greater susceptiblity to attack, the greater facility with which any pest, whether insect or fungoid, must spread without intervening cultivation to arrest the devastation—is a consideration which should always be kept in view. And among the noteworthy services rendered by the lamented Dr. Trimen to the island, must be reckoned the annual warnings he uttered against the increasing rush into tea, and the counsel that other products should receive encouragement even in *pucka* tea districts. We cannot recall a single Administration Report of our late Director of the Royal Botanic Gardens, which did not insist on the absolute necessity of avoiding sole dependence on one product, if the welfare of the individual proprietor, as well as the progress in prosperity of the island generally, be considered. It is not on these grounds alone that we press attention at this particular time to new products. We have in view other than the tea proprietary—though we, by no means, desire to exclude it; and we do not lose sight of the fact that, in coconuts and cinnamon in the low-country, and in cacao, cardamoms (even cinchona and coffee, such as they are) upcountry, we have products which represent an immense capital and whose combined influence on the trade and commerce of the island cannot be mistaken or gainsaid. What we contend is that our resources are by no means exhausted in connection with the staples we have named. The soil and climate of the island are suited for other products; and capitalists—whether those engaged in the enterprises we have already enumerated, who may be anxious about a second string to their bow, or others whom local considerations and financial training may have deterred from the old products—may find remunerative employment for themselves and their money in the minor products we suggest.

The one which specially occurred to us, in connection with the rather sombre report of the Spinning and Weaving Company, is cotton. Why should not the island produce all the cotton it needs, within its own borders? At any rate, why should it not be independent of imports for the raw material which is necessary to keep our solitary mill at work? The matter has been urged with great persistency by "Rambler" in our columns; and the following, from a planter who does not confine his energies to one product, and who has some knowledge of the Northern districts, is the text on which we should wish to say a few words today:—

"There are thousands of acres in the arid districts which are beyond the reach of the great irrigation works, but which, reasoning from analogy, should grow cotton splendidly. It would be a grand public service to bring these tracts into remunerative cultivation; and, as a first step, why should not the best of the dismissed Agricultural Instructors be encouraged, by free grants of land (and even of money under strict business conditions), to pioneer cotton, and set the example to the peasantry of making its cultivation pay?"

The suggestion is one which deserves the attention of the Governor who, we are glad to think, is fully convinced of the importance of official encouragement to agriculture, and whose little speech at the Agri-Horticultural Show at Nuwara Eliya indicated the practical bent of his mind. We have not lost sight of the failures and the successes connected with cotton cultivation in the year that the Spinning and Weaving Company started operations. The Directors imported seed from India, Egypt, and even America, we believe, and distributed small quantities for experimental purposes. We can recall very encouraging reports of yield and staple from the late Mr. Blackett, as the result of experiments in Dolosbage, from Dr. Stork at Heneratgoda, from more than one planter in Dumbara, as also from Ceylonese landowners in other parts of the country. But, so far as we know, no one experimented with the seed on fresh land or on an extensive scale, and, as a result, few, if any, repeated the experiment. The seed was put down for a catch crop, with tea or coconuts, or in some unoccupied corner of a large plantation. The experiment brought to light the destructiveness of the insect enemies with which cotton has to contend, the susceptibility of the plant, and especially the boll, to moisture, and the care that is necessary in harvesting and preparing the crop for transport. It is not surprising that the remunerativeness of the principal products overshadowed the subsidiary stranger. The profits were not dazzling; and men did not care to burden themselves with the petty details and worries of a product which did not yield better returns than the industries in which they were engaged. They did not care to be diverted from their large investments. The game was not worth the candle.

The case would, however, be different, if fresh ground were to be broken for the product; and if the Northern Railway is to be undertaken, it would be to the direct and immediate interest of the Government to provide against the running of empty trucks. The idea of utilizing the service of the youths who have been trained to agriculture in the Agricultural School, strikes us as a good one; but why should concession be confined to them? Let tenders be invited for the purchase of suitable blocks of land on easy terms of payment, on condition that a defined proportion of the land should be devoted to cotton cultivation. If the conditions be faithfully fulfilled, the last instalment might be remitted; or if an acreage in excess of the stipulated extent be devoted to cotton, a free grant of such

excess might be offered. Let an impulse be given to the cultivation by such means and by accepting delivery of the cotton, on behalf of the Spinning and Weaving Company at the nearest Kachcheri, till there is a railway to Anuradhapura; and we are sure the Government will not be a loser by a liberal far-seeing policy. Both directly in the recovery of taxes, and indirectly in a larger revenue from imported food stuffs and in smaller expenditure on Hospitals and Dispensaries, it will reap a certain reward. And may the credit for its initiation be Governor Ridgeway's!

PRODUCE IN GERMAN EAST AFRICA.

The Germans appear to be endeavouring to make the most of their possessions in East and West Africa, and appeals are consequently being made from time to time in Berlin for capital for new companies intended to carry on the work of afforestation and coffee and tobacco planting. The most of the money raised hitherto appears to have been allocated to the coffee industry, and to have been raised fairly easily. For example, a company to work the plantations in Victoria (Cameroons) was recently floated in Germany, and the capital of 2,500,000 marks was over-subscribed by 700,000 marks. Other companies of a similar sort floated during the last three years have also been generally over-subscribed, capital only now being required for the plantations of Sakarra.

In German East Africa the Government has inaugurated a number of nurseries and experimental plantations of various descriptions. Coffee culture is considered to have prospered beyond the experimental stage, the last crop at Usamberre, for instance, having sold for an extraordinarily high price. The coffee bean is, therefore, excluded from the scheme of the experimental plantations, four of which have been established in the neighbourhood of Dar-es-Salaam, a coast town a little to the south of the Island of Zanzibar. Professor Woltmann, of Bonn, some time ago analysed specimens of soil taken from near Dar-es-Salaam, and found the ground unsuitable for the cultivation of many tropical plants; but, on the other hand, in the experimental plantation, located in the immediate neighbourhood of this place, vegetables are grown which find a ready sale, and young eucalytus and palms are reared, which are subsequently removed and planted in the public thoroughfares of Dar-es-Salaam, or distributed among the other coast and interior stations, whither have also been sent consignments of seeds and young trees which, it is hoped, the local authorities will endeavour to carefully cultivate. The Karazini nurseries comprise 45 hectares of ground, mostly given over to the cultivation of cotton. At Msimbari Schamba coconut palms have been planted, one to the hectare, although this seems giving a great deal more ground to the tree than it really requires. These should begin to produce in their seventh year, and will continue to do so for from thirty to fifty years. During that period a net annual profit should result of three-quarters of a rupee per tree. A coconut palm plantation has also been established in close proximity to the powder magazine at Dar-es-Salaam; but the primary function of this appears to be the protection of the magazine from bush fires, which have hitherto been somewhat frequent in the locality. Mulberry planting, which had been tried in different parts of the colony, has now been discontinued in view of the unsatisfactory experience of planters in India.

More important than any of the above enterprises, however, are the Government plantations at Mohorro, situated south of the delta formed by the Rufidji River, and chiefly devoted to tobacco. The soil appears to be of a highly favourable character, and two Sumatra planters whose opinion is prominently quoted in the official return consider the tobacco plants of Mohorro of a very high quality. The small quantity of plants, however—there were 27,000 in 1896—has not allowed of fermentation, and it has, therefore, not been possible to estimate the value of the crop. Indeed, it does not quite seem as though the tobacco would ferment successfully at all; for it is spoken of by Dr. Paul Neubaur, of Berlin, as a "non-fermentative." The same authority, however, states that many German tobacco merchants of consequence, whose names he mentions, are unanimous in the belief that the Mohorro tobacco has a very good future before it from a trade point of view. The soil in which it grows is good, plain, heavy, and eminently suitable. There is plenty of cheap timber easily accessible, and the plantation is at no great distance from the sea. These conditions, co-operating, with the fairly healthy climate, should make the working of the plantation a task of some promise. Last year's plants showed a fine and thin leaf of light colour, which, if it could only be brought to properly ferment, would, in the opinion of the Sumatra planters already referred to, be equal to a good Sumatra leaf. It must be admitted, however, that the most unsatisfactory experience gained in connection with the plantations at Lewa has considerably shaken confidence in tobacco culture in German East Africa. To re-establish this confidence is probably the reason why the Government is devoting itself with unusual ardour to the cultivation of the plant at Mohorro.

The skilled work appears to be in the hands of Chinese, 33 of whom were recently imported from Singapore, the more mechanical labour being performed by negroes, whose daily wages average about 16 pesa. The needs of the Chinese are being studied with a generosity which verges upon the lavish. A large house has been erected for their accommodation, and Mozambique pigs, Bombay ducks, and European chickens have been introduced into the settlement, apparently for their special benefit. Other structures which have recently made their appearance at Mohorro embrace stables, stores, and a large building intended to be devoted to the process of fermentation. Medical men consider the climate relatively good: but it is stated that one Chinaman has already died of fever, and that most of his fellow immigrants since their arrival have suffered from maladies of various sorts. The German officials, however, contrive to keep in fairly good health, and are now occupying themselves with planting experiments of divers description. Vanilla, gutta-percha, and coffee and among the products which it is being sought to place under cultivation; and for all of these the Government believes there is a profitable future. Meanwhile, it does not appear that individual enterprise is being encouraged to any extent, and with the exception of one or two sanguine persons, mostly of British nationality, traders continue to leave German East Africa severely alone.—*H. & C. Mail*, March 19.

NEW METHOD OF TREATING THE VANILLA POD.—A communication, dated 22nd May last, has been received at the Foreign Office from Mr. Courtenay Bennett, Her Majesty's Counsul at Reunion, inclosing extracts from the *Independent Creole* of Reunion, containing a paper read by M. Dolabartz, Manager in Reunion of the Credit Foncier Colonial, at a recent meeting of the Reunion Syndicate Agricole upon a new process of treating the vanilla pod:—According to M. Dolabartz the operation consists of drying the vanilla in an hermetically closed vessel by means of chloride of calcium in the proportion of about one kilog, for every kilog, of dried vanilla obtained. The chloride of calcium is not lost, as it can be easily regenerated by heating it in an iron or copper receptacle; one lot of chloride of calcium is thus sufficient for several processes if kept, after regeneration, in an hermetically closed vessel. According to information received, 2·981 kilogs. of raw vanilla will produce about a kilog. of prepared vanilla. It can be easily understood that vanilla dried in an air-tight vessel must lose much less vanilline than when dried by the ordinary process, by which it is exposed in the open air for several weeks. (*Board of Trade Journal*, August —*Kew Bulletin*, 1896.)

INDIARUBBER IN GERMAN AFRICA.

In an official report on "The Products of the German Colonies and their Industrial Value," Dr. O. Warburg writes: In the export of caoutchouc only three of the German colonies of tropical Africa are of importance. Caoutchouc is the chief article of export from Cameroon and German East Africa. Although in tropical Africa a few other plants (*Ficus* and lately *Kickxia*) have furnished serviceable caoutchouc, in our colonies, rubber has been gained almost exclusively from the *Landolphias*, especially *L. Kirkii* and *L. Petersiana*, in East Africa, and *L. Comorensis var. florida*, in the Coast colonies. In the northern part of the Cameroon district only the milky juice of an unidentified tree is turned to account. The exports were:

TOGOLAND.

	Pounds.	Value.
In 1892	81,400	$33,500
In 1893	63,800	24,750
In 1894	68,200	29,000
In 1895 (excluding first quarter) ..		41,000

[It must be taken into consideration that only a portion of the caoutchouc obtained in Togo is exported to German porte and that therefore the figures as given here are too low by half.]

CAMEROON.

In 1892	710,600	$256,000
In 1893	910,800	356,750
In 1894	880,000	326,000

GERMAN EAST AFRICA.

In 1891	521,000	$240,000
In 1892	686,000	282,000
In 1893	500,000	233,000
In 1894	415,000	247,000

That this enormous quantity of 1,363,200 pounds to the value of $602,000 can only be obtained by the destruction of countless caoutchouc trees, is plain, as no method excepting the cutting off of the trunks has as yet been discovered, and this indicates that before long the export must decrease unless heroic measures are adopted to check this wholesale destruction.

To obtain caoutchouc advantageously from plantations has so far proved a failure. The many experiments in other countries have found their followers here. In Togo the d'Almeida Brothers, last year, planted 1,500 Ceará rubber-trees, for shading their coffee-plants. The Kpeme Plantation Co. contemplate making a caoutchouc plantation in the vicinity of Togo. Experiments with these plants as shade trees in Cameroon (Victoria) had to be abandoned as they were damaging the coffee trees. The Pará caoutchouc tree is now being experimented with. In German East Africa Perrot planted, on the Mkulumuzi plantation, owned by the West German Trading and Plantation Co. 10,000 Ceará caoutchouc-trees, and the v. St. Paul plantation have put out 30,000 caoutchouc plants.

* * *

From other sources the exports of India-rubber from German East Africa are found to have been for 1894, as follows:

To—		Pounds.	Rupees.
Germany	..	156,115	181,905
Great Britain	..	17,600	25,766
Zanzibar	..	339,665	475,589
Total	..	513,380	6 80,260

Converting the rupee at par this valuation would be equal to $341,630, or at the present value in the United States currency, only $157,833.—*India Rubber World*, March 10.

RUBBER RESOURCES OF SIERRA LEONE.

The India-rubber resources of the British protectorate of Sierra Leone, West Africa, received special attention from the colonial governor, Colonel Frederic Cardew, C.M.G., during his recent prolonged tour in the interior, an account of which has been presented to the legislative council and printed in the Sierra Leone *Weekly News*. It was the third tour undertaken by the governor within three years, each over a different route, and involving in all same 1875 miles of travel. As a result, the extent and direction of the water-courses are now much better understood, and the extent of the forests more accurately known, especially in the valley of the Mano river, forming the boundary between Sierra Leone and Liberia. Much of the governor's latest route was through territory never before visited by white men.

"Though the indigenous products of the protectorate may not be superabundant," writes the governor, "still, I believe, partly from want of cheap means of transport, a lack of enterprise on the part of the traders, the ignorance of the natives in the methods of gathering and preparing their products, such as India-rubber, and palm-oil, and their paucity of wants, not nearly half the products of the country are ever brought to the markets. There are large tracts of forests with abundance of rubber and valuable timber awaiting exportation. They have been in no sense explored, and they only require intelligent and systematic methods for gathering the rubber to yield their wealth to the first comer who has the necessary enterprise."

Referring to a certain district traversed during his late tour, he says that the extent of forest land within it may be computed at not less than 600 square miles. Along the greater portion of his route the forest is of some eight to ten years' growth, the former cultivators of the soil having disappeared on account of the activity of slave-raiders at one time. But in many parts of the district virgin forests still exist. It is of particular interest, however, to learn that "even in the forests of recent growth there is an abundance of rubber. This is contrary to the accepted view that the permanent disappearance of the African rubber creepers is the inevitable result of the felling of the virgin forests. This was the opinion expressed by G. F. Scott Elliot, whose official report on the botany of Sierra Leone was reviewed in the India Rubber World of November 10, 1894.

Unfortunately Governor Cardew's enumeration of rubber-bearing species does not render their identification possible. He does not even quote the same local names as those given by Mr. Elliott, whose observations were made in a different district. The report continues:

"Three kinds of such [rubber] plants were pointed out to me. Two were vines called, respectively, in the Timni language "lilibue" and 'nofe,' and the third a tree called in the same language 'kewatia.' The 'lilibue' yields the choicest rubber in the protectorate. In gathering it, incisions are made in the bark of the vine, which is not, however, always cut down. In the case of the 'nofe' vine, it is invariably cut up into small pieces of about six inches in length, and thus completely destroyed. The 'kewatia,' *i. e.*, the rubber tree, appears to grow rapidly, and in eight or ten years to attain a girth of from two to three feet, but the tree, however, like the 'nofe,' is also destroyed in the process of gathering its rubber; it is felled and the bark ringed at intervals of about six inches along the trunk. The rubber appears to be treated in a different way to that of the vines; the latter is coagulated with lime juice, but the rubber which exudes from the rings cut in the tree is placed in hot water, on the surface of which it coagulates, and is then cut into strips, which are formed into balls for the market."

The governor considers it absurd that large trees should be destroyed for a paltry few ounces, or even pounds, of rubber, and urges that steps be taken to instruct the natives in better methods of rubber gathering, before greater damage has been done to the forests. An account of the methods of preparing Pará rubber for market was published at the recent agricultural exhibition at Sierra Leone, and the authorities have since drawn up "an account of other processes which may be suitable to the rubber industry of this colony." The natives of some of the districts appear to be ignorant not not only of methods of rubber gathering, but also

of the value of rubber. "If the traders," says the governor, "who purchase the rubber and other indigenous products would inform the government in what direction they consider reforms should be introduced in the prevailing systems of gathering such produce, the government would, I feel sure, lend an attentive ear to their sugestions."

Sierra Leone rubber has long figured in the English market, and is regularly quoted in New York, although Sierra Leone grades have entered less into consumption in the United States, proportionately, than Accra and some other African sorts. Kramrisch & Co. (Liverpool) have supplied The India Rubber World with the following statement of the imports into Great Britain of Sierra Leone rubber for six years past, though it may be said that not all the rubber thus classified is the product of the Sierra Leone protectorate. The figures given are somewhat greater than the amounts credited to Sierria Leone in the British official trade reports:

	Pounds.		Pounds.
In 1891....	2,275,840	....In 1894....	1,944,320
In 1892....	2,076,480	.....In 1895....	2,222,080
In 1893....	2,352,000	....In 1896....	1,944,320

Kramrisch & Co. further report: "Rubber from Sierra Leone played an important role during the past year. The rubber coming from that district found increasing favor among manufacturers, but contrary to expectations the receipts from Sierra Leone decreased, causing a considerable advance in price. The arrivals of Sierra Leone rubber [in England] during the first six month of 1896 averaged about 110 tons per month, of which quantity a goodly proportion was of the "red" unsoaked kind. The average arrivals during the latter six months were only about 35 tons per month, of which only a trifling quantity consisted of that red quality most in demand. Prices for the latter have therefore steadily advanced, 2s 4½d. being the highest price paid."

In comparison with the figures given in the last paragraph, it may be added that for severai years past the average monthly arrivals in England of Sierra Leone sorts have been 106 tons during the first half of the year, and 44 1/3 tons during the latter half.—*India Rubber World*, March 10.

NEW PRODUCTS FOR JAFFNA.

The raising of Tomatoes for sale by two farmers living in the Pt. Pedro district has suggested the question whether it would not be desirable to encourage the introduction of new products into our peninsula. It seems that for a year or two past the missionary living at Pt. Pedro has started a quantity of young tomato plants and distributed them to different men in the district, to experiment with. As a result this fruit has been plenty in the vicinity of Pt. Pedro for two years. The plants were set out in good soil and duly cared for, and with January fruit was gathered and sold, especially to Europeans, at ten cents a pound. What the yield has been this year we do not know, but during the past month about one hundred pounds have been bought at Udupiddi. A still larger amount must have been sold during January and February when the fruit was at its prime. With the hot weather the vines die off, or, if they survive, produce very small fruit.

This is only one new product. Others will suggest themselves to our readers. New fruits and vegetables might well be introduced into our peninsula, and with profit. There is no question but that better varieties of many of our vegetables might be cultivated to the advantage of all concerned. There are new kinds of Brinjals, Squashes and Beans that might well be tried, and that would be an improvement on the present varieties. Certain kinds of vegetables that grow in the temperate zone, might, in favourable localities, do fairly well; such as are now raised at the Kachcheri and in one or two other places.

Then as to fruit, we see no reason why the Florida or Sicily oranges should not be grown in Jaffna. Why should not the Mangosteen be raised here? Why should we not have a better variety of the Pine apple and the Guava? And surely more can be done with the Grape than is being done at present. We believe there are several varieties of grape that might well be introduced into our peninsula.

It needs a little enterprise of course. Nothing can be done without some labor and cost, and undoubtedly the gains would be small at first. But in time it would be seen that Jaffna had been greatly benefitted by the introduction of these new kinds.

Again, the Government should encourage the farmers to experiment with new things, as is done in civilized countries. Seeds and plants should be distributed free for a year or two, or until it was seen that the farmers were really taking an interest in the growing of the new varieties. Prizes might well be offered for the best display of the new vegetables and fruits, at some public gathering. It would be a good idea to have an annual fair, or at least have one once in two or three years. It would, in our opinion, act as a stimulant and encourage the people to go out of the beaten track of the dead centuries. Progress would be the watchword instead of custom.—"Jaffna Morning Star," April 1.

LIBELS ON B. C. AFRICA.

PLANTING EXPERIENCE.

Our attention has been drawn to another of those malicious libels on B. C. A which we regret to say have been so frequent of late. This one which disgraces two pages of the 7th November issue of "The Field" and is written by some worthy under the nom-de-plume of "Falcon" is one of the worst it has been our misfortune to peruse as "Falcon" as might be expected is one of those would-be Nimrods who come rushing up the river determined on slaughter, and after staying a month or so principally at Chiromo and Mlanje, get a slight touch of fever and then clear for dear life. After getting over their fright, (if this is ever possible) they consider themselves in the light of renowned travellers and quite in a position to criticise anything and everything pertaining to British Central Africa, although it is 100 to 1 that they have never been outside a radius of 30 miles.

"Falcon" after attracting the readers attention by explaining that he wishes to tell them the "plain unvarnished truth," (which by the way would be quite impossible for him to do considering his length of residence in the country) goes on to give his opinion on B. C. A. Coffee. "As a matter of fact," says the all-wise "Falcon," the slopes of the Mlanje range of mountains, once covered with heavy overgreen forests, have long since been denuded of them by the Manganja tribe, who have for ages carried on the very wasteful system of cultivation known in India as koomree. The forest has been felled and burnt, as fast as it renewed itself, and a crop of Indian corn, or sorghum obtained from the soil at intervals of from six to ten years. The humus and more valuable soil has in this manner been removed, and washed away by the annual rains, leaving behind nothing but a *very indifferent subsoil.* It is in such soil as this that many of the planters have planted coffee, and the *wretched appearance of the plants* is sufficient proof of the worthlessness of the land. But even elsewhere the appearance of the coffee, under the most favourable conditions, and in good soil, is such as to convince anyone who has had practical experience of coffee in other lands, that in British Central Africa it has not found a congenial home. In some plantations borers are excessively bad, more than 50 *per cent* of the trees having been destroyed by them; in others the primaries die back from the cold winds that blow in winter.—With the development of mining enterprise wages must rise, and sooner or later leaf disease, which is rampant in the coffee estates in Usambara, will make its appearance."

Such is a sample of the kind of twaddle indulged in by this wiseacre, and from it our readers will be best able to judge how much the writer knows about coffee in B. C. A. Then comes the usual tirade on Blackwater fever and the cruel slaughter of game

in B. C. A, but as usual a hundred times exaggerated. As his remarks mainly apply to Mlanje (probably he never visited any other district) we would draw his attention to one Mlanje plantation which last year yielded a crop of 30 tons, and other plantations gave good crops according to acreage, which does not look like "very indifferent sub-soil." Among our Planting community we have now a good few men who have had that "practical experience of coffee in other lands" which the writer talks about, and have come to the conclusion that coffee *has* found a "congenial home" in B. C. A. These men are not fools and would not have embarked on planting in this country unless they were firmly convinced of its great future.

But the proof of the pudding is in the eating of it, and the high prices realised for Nyasaland Coffee which we publish today gives the lie direct to "Falcon" and all his kind. "It is singular," say the London Brokers of the Zambesi Industrial Mission, "that although every effort is being made *all over the world* in coffee growing districts to produce fine quality, *it is quite the exception* that such a result as yours is obtained." The foregoing does not entirely correspond with "Falcon's" remark that in B. C. A. coffee has not found a congenial home.

The supremely ridiculous statement that in some plantations borers have destroyed 50 per cent of the trees, we can only put down to the fact that some naughty Planter must have been having his little joke at the expense of this innocent abroad. As for the cold winds we only wish there was a chance of them coming our way.

We cannot do better however than again quote our remarks which appeared in our August number in answer to Mr. Morgan's criticisms on B.C.A.—The only point which is really serious is the menace to our labour supply should gold be discovered. It is not however likely to be found in B.C.A. and should it be discovered in payable quantitites in the B.S.A. Co.'s territory, a wise Administration could easily frame such regulations as would prevent the disorganization of our labour supply. The B.S.A. Territory, unlike the Rand, has a native population of millions to draw from so that it would not be necessary to recruit labourers in B.C.A. Such criticisms as Mr. Morgan's may do some good in keeping the wrong sort of man out of the country for B.C.A. is no place for "armchair" planters. Under a wise and beneficent government there can be no doubt that B.C.A. will become one of the foremost states in Africa. We have a unique geographical position, the country is at such an elevation as to make it fairly healthy and development will make it healthier still: we have high plauteaus suitable for sanatoriums within easy reach of nearly every part of the protectorate; we have already got telegraphic communication and a railway is certain within the next three years. All that is required is capital and energy, the one without the other will not suffice, but the prospects for the two combined are of the best. In saying "all that is required" we are assuming that we have a government suited to the country. This however is at present by no means the case and the sooner the present provisional form of government is changed for a more permanent one with a properly organised civil service the better for the country.—*Central African Planter* Feb. 1.

STEAM PLOUGHING IN INDIA!

We observe from an official list of agricultural implements tried during the year 1896 that a steam cultivator costing R4,000 was in use in Sarun District. A local indigo-planter reports that he saw it tried in very dirty lands which had not been cultivated for two years, and it brought out all the weeds and grass by the roots and thoroughly broke up the land. He also reports that he saw it tried on land in which there was no apparent moisture, and within 10 days of its use the moisture was at the surface.—*M. Mail*, April 6.

HILL TRAMWAYS COMMISSION.

We call attention to the letters from Government and the Report appended thereto of the above Commission. We have read the latter, and have only space and time to ask what practical good is to be served by such hastily got-up, imperfect and in some respects misleading documents. We have never in the whole history of Railway Commissions in Ceylon seen a State paper of a more uncertain if not perplexing character than the Report before us. This is, of course, owing to the wide scope of its Commission and the limited space of time afforded for inquiry and examination. That time would not be enough in our opinion, to do justice to any *one* of some half-dozen lines of tramway discussed and more or less reported on. The only line in fact, on which a useful Report might have been drawn up is that from Nanuoya to Nuwara Eliya and Kandapola, and here any practical result, it seems to us, is rendered impossible through the absence of an Engineer with experience in Electric Railways. The indenting for such an Engineer ought surely to have preceded the Commission. Both Mr. Mackintosh and Mr. Christie discuss questions connected with electric lines; but neither gentleman, we suppose, has had actual experience, and every year is witnessing great improvements on Electric lines. Then again the Hewaheta-Maturata line is thrown out of court as unworthy of consideration; while we should have considered a line from Peradeniya on the Deltota road towards Hewaheta a scheme which ought to be both possible and promising. But then the fact is that not one of the schemes named in this Report can be said to be fully or exhaustively treated. The Commission have apparently gallopped over the country on paper and presented a Report which must be considered both cursory and imperfect, or very preliminary indeed.—Mr. Saunders signs the Report: how many meetings did he attend, and did he visit any of the districts concerned?

"RAMASAMI": OUR LABOUR SUPPLY.

(*Communicated.*)

We have so often been accustomed to the cry of wolf in the labour market that we have hitherto hesitated to credit the very serious reports which reach us from the various districts of the island as to the actual scarcity of coolies. Very many estates, it seems, could now profitably employ double the number they can muster, while not a few are striving to keep the estate in cultivation and overtake plucking with one-third the necessary force.

We have long prided ourselves on our usually ample supply of cheap labour and could afford to smile at the attempts of less favoured tropical colonies to compete with us in our special products; but a sad change has come over our prospects in this respect during the past two years.

"Ramasami," from being one of the most docile and industrious of men—the Scot of the East—has, in too many cases, degenerated into a thriftless, unstable vagrant, wandering from district to district in order to dodge his creditors and obtain fresh loans. The actual number of coolies in Ceylon is not so much short of requirements as that the muster of honest workers is out of all proportion to the number of idle loafers in the lines and bazaars.

Now the cure for this seems simple enough, viz.—Make it illegal to lend or rather to recover from an estate coolie more than, say, R10 or R20 and the thing is done. But we are not sanguine that the Government will be very ready to move in the matter, though certain enough that legislation in this direction would prove a boon to the planting interests and a much-needed protection to poor misguided Ramasami himself.

There are, however, other interests at stake which pull in a different direction, but we would fain hope that these—as described to us by an up-country correspondent—are somewhat exaggerated. "These vagrant kanganies," he says, "are a fruitful source of profit to proctors, around whose doors crowds may daily be seen—seeking and obtaining advice how to act."

Certain it seems that the good understanding which was wont to exist between the coolies and their doray now, as a rule, no longer exists, and until we can manage to deal with, and protect the labour force already in the country, it seems needless to talk of tapping new sources of supply.

It is against this growing demoralization that we would earnestly raise our voice. The cause is palpable enough. How best to counteract it is the question. Money, as usual, is at the root of the evil, *facilities for borrowing, reckless spending, ruinous and unscrupulous usury.*

What are called estate advances seem to have risen from an average of R20 a head two years ago to R50 at the present moment, and there seems every likelihood of this sum being doubled in a few months.

In former times, these advances were given by Superintendents for the express purpose of procuring labour from the Coast, and any breach of this understanding would have been treated as a case of obtaining money under false pretences. Now, alas! the Coast is seldom thought of, it is simply a case of "Show me your tundu."

The Toolakan Jew is master of the situation, and it is at his instance that the ever-recurring move is made. The estate manager is helpless. At his wit's end to save the flush, he pays the exorbitant demands and staves off the evil day for a few months, till the Toolakan's interest again accumulates—when pastures new must, at all hazards, be sought. It is not the debt to the estate only, but the native money-lender that has to be reckoned with. The amount on the "tundu" may be only R1,000, but, as a rule, R500 "adium" is demanded.

PERAK NOTES.

(*Perak Pioneer.*)

In February a Malay was killed by a tiger while working in his garden at Kota Stia.

Mr. Curtis, the tea planter from India, is anxious to acquire 5,000 acres of land for planting purposes in Perak.

Mr. J. J. Tait has planted 75 acres of coffee since October last at Tanjore Malim. He intends to put in a few acres of tobacco as an experiment.

Mr. A. T. D. Berrington, the Senior Magistrate, leaves for home via America tomorrow on long leave. Mr. C. Wray will probably act for him on the return of Mr. R. D. Hewett from leave until our new S.G. has been appointed when Mr. Watson will take up the acting appointment.

We regret to hear that owing to the Medical Adviser to the Colonial Office having declared Dr. Wheeler to be unfit for further service in the Equatorial region, he has been compelled to retire on pension.

MINOR PRODUCTS.

CINCHONA.—The monthly London cinchona-auctions held on Tuesday were of small extent. Five brokers offered bark, their catalogues containing the following quantities:—

	Packages		Packages	
Ceylon cinchona ..	46	of which	46	were sold
East Indian cinchona..	259	,,	259	,,
West African cinchona	198	,,	198	,,
Java cinchona ..	200	,,	200	,,
	703		703	,,

It will be seen that every package was disposed of; indeed, a much large quantity would probably have found buyers, for the tone was one of unusual animation, and an average advance of 10 per cent. on the last public-sale rates was readily paid. The best lots realised a unit of ⅜d per lb., but the general run of the parcels scarcely reached that figure. The following are the quantities of bark purchased by the pricipal buyers:—

	lb.
American factories	44,407
Messrs. Howards & Sons	42,966
Auerbach factory	18,955
Imperial Quinine-works	11,720
Brunswick factory	6,536
Frankfort-on-M. and Stuttgart works	3,661
Various druggists and others ..	4,331
Total ..	132,576

CROTON-SEED.—A small parcel has been sold to arrive at 85s per cwt., the same figure as that paid at the last auctions. At auction 9 bags rather dark mixed seed were bought in 30s per cwt. being the highest bid forthcoming but the lot has since been sold privately at 75s per cwt.

KOLA.—The arrivals have been considerable lately, especially from the West coast of Africa, and a parcel of no fewer than 211 bags has been entered from Hamburg by the "Lapland." There was a large supply at today's sales, but no business was done except in 3 packages common water-damaged rubbish, which sold without reserve at ½d per lb. For good *West Indian* 8d per lb. is asked.—*Chemist & Druggist*, March 20.

A NEW CEYLON PLANTATION COMPANY.

The latest venture is the Oodoowerre Estates Company of Ceylon, Limited., the memorandum as well as articles of Association of which appears in the *Gazette*. The objects for which the Company is established are, among others, to purchase or otherwise acquire the Oodoowerre estate in the district of Badulla, or any part or parts thereof. To establish and maintain in the United Kingdom, in Ceylon, or elsewhere, stores, shops, places for the sale of tea, coffee, cocoa, and other articles of food, drink, or refreshment wholesale or retail, and to establish in any part or parts of the world agencies for carrying on or developing the business of the Company or any branch thereof. The nominal capital of the Company is R500,000, divided into 1,000 shares of R500 each, with power to increase or reduce the capital. The signatories are Herbert Tarrant, Katharine Tarrant., Jas. A. Henderson, A. O'Dell Figg, R. Huyshe Eliot, Annie Buckland Eliot and John C. Popham.

DISEASE OF NUTMEG TREES.—The Dutch-Indian Government—says the London *Chemist*—have under consideration the advisability of sending Dr. J. M. Janse, of the Java Botanic Gardens, to Menado and the Banda Islands to inquire into the disease that is affecting the nutmeg-trees, and into one which appears to be threatening the "cocoa" plantations.—We are not clear whether "coconut" or "cacao" plantations are here meant: we know Dutch scientists have been investigating disease in the cacao tree.

MICA.

The Mica Manufacturing Company, Limited, has been formed with a capital of £80,000 in shares of £1 each, to equire all the mineral rights of the Lake Girard Group of Mica properties, comprising about 1,700 acres, situated in the provinces of Ontario and Quebec, Canada. There has been spent about £70,000 in selecting, acquiring, opening up the properties, and establishing the business, and there has been sold, either in rough or prepared form, mica to the valne of £40,000. The purchase price has been fixed at £63,000, of which £3,000 is payable in cash, and the balance in shares, or partly in shares and partly in cash, leaving 17,000 shares available for issue for the provision of working capital.—*Indian Planters' Gazette*, March 27.

THE RESULT OF THE DISAPPEARANCE OF FORESTS IN TRINIDAD.

It is pointed out in the *Bulletin of Miscellaneous Information* of the Royal Botanic Gardens, Trinidad, that the rainfall for that island is slowly but surely decreasing. The average rainfall for the decade 1862 71 was 66·715 inches; for the next decade (1872-81) it was 65·993, and for the third decade (1882-91) it was 65·037. The decrease indicated by the first and third values is 1·678 inches or 2·51 per cent during the thirty years from 1862 to 1891. Presuming that the same rate of decrease runs on for the next sixty years, Trinidad will then suffer from a rainfall diminished by about 8 inches. Mr. Hart points out that a rainfall decreasing at such a rate is alarming; and if the inference is carried on, it follows within that, a measurable distance of time Trinidad must become an arid desert as barren as the Great Sahara. The cause of the decrease in said to be the disappearance of the forests.—*Nature.*

[We doubt the inference altogether: perhaps the next 30 years may prove the "wet" cycle for Trinidad. Forests in Ceylon have been far more cleared than in Trinidad with no falling-off in total rain.—ED. *T.A.*]

VARIOUS PLANTING NOTES.

PROGRESS IN TEA.—Apart from the large clearings in the Balangoda district of Messrs. Finlay, Muir & Co. (1,000 acres), Mr. Leaf (300 acres) and others, it is said that there are 2,000 acres ready to plant in the Kelani Valley this season.

CASTILLOA ELASTICA IN TRINIDAD.—Mr. J. H. Hart, F.L.S. Superintendent of the Botanic Gardens at Trinidad, writes:—"We have raised and sold some 10,000 *Castilloa* this year, and we have a plantation in Tobago, and one here ready for bleeding."—*Kew Bulletin.*

A SOUTHERN planter from Wynaad, writing about Mr. James Ochterlony, and his command of capital, says:—"The standing monument of enterprise is the grand old Ochterlony Valley with its thousands of acres of coffee, tea and cinchona." The well known standing monument of another Ochterlony in Calcutta is a high tower—considerably less useful!—*Madras Times*, April 9.

A WELL-KNOWN FOOCHOW TEA PLANTER, Mr. Sing Put, has lately been travelling through Ceylon, garnering up-to-date information about tea growing, picking, and curing. The tea industry in the Foochow country has been seriously affected during the past few years by the enterprise of the Ceylon and Assam planters, and the Chinese are now apparently trying to pull themselves together to make headway again.—*London Echo*, March 18.

THE TEA CROP.—There seems an unusual area of tea pruned (lightly) this season upcountry; but the recent alternate showers and great heat will bring on all such very quickly, and. indeed, planters generally will be very busy with "flush" during April. We hear the old estates of the Gallaha Company in Nilambe and Hantane very highly spoken of, by impartial authorities, for their fine cover and jât of tea as well as the good crops promised. Gallaha Factory is one of the largest and most complete in the island.

THE RICE CROP PROSPECTS in the 14 chief rice-producing districts of Lower Burma is as follows:—The area under crop has decreased by 10,408 acres from the area reported last month. The area reported from Akyab is less by 31,154 acres than that of last month, while the area in Thatôn has increased by 38,078 acres, and there are small changes in several districts. The anna estimate in Prome has been raised to 14½ annas; in other districts the estimates are unchanged, The estimate of the exportable surplus is the ame as that of last month.—*M. Mail*, April 7.

KAPOK has not been received in this country on a very large scale. It is not, however, quite unknown here. The following particulars have been received from a well-known firm in the City:—Messrs. Ide and Christie to Royal Gardens, Kew, 72, Mark Lane, London, E. C., September 28, 1896. Sir, In reply to your letter of the 24th instant, Kapok is coming here regularly to the extent of 100 bales a month from India and Ceylon. Today's value is 2½*d.* to 4*d.* per lb. The trade is not large, but may grow. Yours, &c. (Signed) Ide and Christie. Dr. Morris, C.E.G., Assistant Director, Royal Gardens, Kew.—*Kew Bulletin*

"COFFEE GROWING"—is the subject of a brief paper in the Agricultural Gazette of New South Wales by an old Ceylon planter, Mr. C. Skelton. Mr. Skelton was pleased with a sample of coffee grown on the Clarence river; but said it would not pay unless 6 cwt. an acre could be got and even then be dreaded frosts. He gives practical advice to intending planters, and names "John Walker & Co." as the firm to supply all necessary machinery.—In Northern Queensland, rather than in New South Wales, we should expect to find a suitable region for coffee.

AFRICAN COFFEE.—Of late years the production of coffee in British Central Africa has considerably increased. In 1891, the first few sacks were sent to the London market, and favourably reported on. In 1895, nearly 170 tons were exported, last year the total rose to 300 tons, and this year it is expected that there will be at least 600 tons. It is estimated that at the end of the century the export of coffee from the Shire highlands will amount to 2,000 tons, and the planters are agitating for the construction of a railway from Chiromo to Blantyre, in order to obviate the present difficulties of transport.—*Daily Chronicle*, March 16.

CACAO DISEASE.—We are pleased to learn from Mr. R. S. Fraser of Warriapolla that the precaution of sending diseased parts of the attacked cacao trees in advance to high fungoid authorities is not to be lost sight of The Director of Botanic Gardens will see to this - if he has not already done so, and doubtless on the resulting report, will depend the decision as to a Cryptogamist or other specialist coming out to Ceylon. It is very mysterious at present how the 'red" cacao suffers—decaying as individuals or in clumps; while the extraordinary thing is that a diseased tree if cut at the neck, very quickly throws up perfectly healthy shoots,

OUR LABOUR SUPPLY.—The Planters' Association has sent round a Circular calling for information as to the wants of planters in respect of coolies—how many additional men, women and children would be taken on if made available. Meanwhile Colombo Agents and others have been getting a Circular from a firm at Patna offering to supply "good coolie labour" to Ceylon—no doubt on the same terms plus carriage as to Sylhet, Cachar, &c. !

GAMBIER, COCONUTS, &C., IN THE STRAITS.—From the Report on the Coast District for the year 1896 by Mr. C. D. Bowen, we quote :—

The increase in the number of small settlers in the vicinity of Port Dickson has been very marked, especially along the Lukut road; a great many of these people are Japanese, who are about the best class of agricultural settlers. There was a very fair increase in the export of gambier, but a slight decrease in the export of pepper and tapioca. A block of 300 acres was alienated for the cultivation of coconuts and more land for this kind of cultivation is likely to be applied for during 1897. So much of the land along the coast has been taken up in former days for gambier that very little land for the cultivation of coconuts remains.

"ALBIZZIA MOLUCCANA."—We are reminded that the first seed of this valuable tree introduced into Ceylon came from Mr. Mundt, Director of Botanic Gardens, Java, to Mr. Neate of Pussellawa—then of Nawalapitiya. Mr. Wm. Money of the Indian Civil Service—brother of Col. Money—and the clever author of "How to Govern a Colony," first recommended Mr. Neate to get this seed and assured him if he planted up one or two hundred acres, there was "a fortune in it." Unfortunately for himself, Mr. Neate merely grew a few trees at Nawalapitiya and distributed the rest of the seed. The timber of his oldest trees—some of them giants—was tested for tea boxes and found to be very suitable. The tree is one that grows readily at a variety of elevations.

THE OODOOWERE COMPANY.—So the old and almost classical property of Oodoowere is at length to give its name to a Limited Company. It was one of the earliest of Badulla Coffee estates opened. In 1858 Sir Henry Ward reported "the finest piece of young coffee I have seen in the whole island is on Mr. Bertlin's Oodoowere estate." In 1865 after reporting Sir Hercules Robinson's first, and Major Skinner's farewell, visit to Haputale, we rode up the Pass from Haldummulla, through the first clearing of Gonamatava and on past Bandarawela down to Oodoowere where we passed the night in Mr. James Irvine's hospitable bungalow. Everything was flourishing then; but Oodoowere had a big rest before it was put into tea and there are promising reserves.

A FINE SPECIMEN OF COFFEE grown from Guatemala seed, was received at this office, says the Hilo "Tribune," from Mr. J. M. Horner's plantation at Kukaiau, from a four year old tree, which had upon the one primary received nearly 900 well developed coffee cherries, and there were forty such primaries on the same tree, fully three-quarters of a pound to the primary. Some of these primaries Mr. Horner informs us had 1,000 cherries, and says he will have twenty-five tons of coffee this year, and where all his trees from Guatemala seed he would have sixty tons from his plantation instead of about thirty tons. That is the way he replies to the difference and selection of seed. Side by side the Guatemala and wild coffee trees are growing, and the former produces eight times the amount of the latter. The growth of wood is in favour of Guatemala by long odds.—"Planters' Monthly."

A FAMOUS CACAO PLANTATION.—Yattawatte has long been known as a leading "cacao walk" as they say in the West Indies, and Mr. Jas. Martin has been identified with it for the past seventeen years or so. We recall it when the property of Messers. R. B. Downall and Col. Young in 1896. Mr. Motague Kirkward (of Japan) writes :— "My visit to the Yattawatte cocoa estate was very instructive, interesting, and delightful with such a good host as Mr. James Martin."

COTTON GROWING IN THE NORTH.—With reference to our editorial deliverance on minor products and the prospects of cotton succeeding in the Northern districts, we learn that there is a large expanse of fine forestland from opposite Dutch Bay northwards. The "black cotton soil" of Mannar (identical with that in Tinnevelly) has always been famous. In fact the conditions here, as elsewhere, point to cultivation and civilisation advancing inland from the coast and there is far greater encouragement for settlement from Chilaw right on to Mannar and onwards from Puttalam to Anuradhapura, than there is in the miserably forbidding country North of Kurunegala.

OUR LONDON TEA REPORT.—We ought to have drawn special attention to the exceptionally interesting Report dated March 19th from Messrs. Gow, Wilson & Stanton. They give a most encouraging account of the re-exports of Ceylon tea from the United Kingdom, more especially to Holland, Denmark, South America, and South Africa. Their table shows that the total of the re-exports compare as follows :—

CEYLON.

		lb.
Total	1896	8,496,663
,,	1895	7,147,071
,,	1894	5,166,029
,,	1893	4,112,232
,,	1892	3,448,058

—while the total of Indian tea re-exported in 1896 was only 4,339,640 lb. We must refer to the "blue sheet" for details. The increase in 1896 over 1895 in the case of North America is not quite 400,000 lb. In the case of "Russia and Germany," taken together, we get an increase of over 600,000 lb. in the same period.

RUSSIA AND INDIAN TEA :—Commenting upon the prohibition of the importation of Indian tea at Batoum, by the Russian authorities, the Calcutta *Englishman* of the 24th inst. says :—If we may go by precedent this pernicious example will not improbably be followed by many other countries. Of course we have the assurance that Great Britain, the largest market for Indian tea, will remain open, but nevertheless should the Indian product be interdicted by other European Governments the effect would infallibly be to seriously retard its expansion in other parts of the world. This is a matter which the Government of India cannot afford to ignore. Representations should be made by the British Foreign Office to the Tsar's Government against what looks not so much like a sanitary precaution as an attempt to inflict a serious commercial injury upon India. If we submit tamely to treatment of this kind there is no saying where Russia may stop. We call upon Government to take steps to combat this mischievous regulation, not even pausing at hinting its willingness to retaliate if it is persisted in. Russia is certainly vulnerable in regard to her enormous petroleum trade with India.

THE DUTY ON TEA.—We have now arrived at that period of the year when Budget anticipations are the order of the day. Sanguine experts conjecture that the surplus will reach the highly satisfactory figure of two millions. If this calculation should prove to be accurate, those interested in the tea industry may fairly claim a remission of the impost whichnow presses so heavily on their produce. Tea yields a revenue of nearly four millions a year. It is generally looked upon as being one of the prime necessaries of life. The bulk of the tea consumed is a British product. As we have reiteratedly pointed out, the duty is regarded by "the man in the street" as a tax on food, and nothing would be more popular at home than for the Ministry to take the line we have advocated of reducing or abolishing the impost. Anything that would benefit India at the present juncture now that she is the victim of plague and famine and consequent depression in business would be ungrudingly allowed even by the many financial interests that always scramble for the crumbs which fall from the table of the Chancellor of the Exchequer in surplus years.

CEMENT FLOORS.—A novel kind of flooring has been provided in the power station of the Edison Electric Illuminating Company of Paterson, N.J., U.S.A. This floor consists of a huge casting of cement forming the undivided door of the entire station. The floor proper is 4 inches in thickness, but at intervals of 15 feet there is cast on the back or underside of this 4 inch web a beam 18 inches in depth and 9 inches in width, running crosswise of the station and resting upon the supporting piers of brick. The floor is further stiffened by longitudinal ribs 14 inches in depth, and tapering from 4 inches to 6 inches in width, placed 3 feet 6 inches apart, running between the heavier crosswise beams lengthwise of the station. These stiffening projections are a part of the main casting, so that the floor is virtually one immense casting of cement, with stiffening ribs on its under side, supported upon brick piers. The floor is completely fireproof, and is said to cost less by one-third than a floor involving the use of iron beams, while it affords a firm foothold, and presents a surface sufficiently smooth to be easily kept clean. It will be interesting to loarn what effect oil will have upon it.—*Engineer*.

A STANDARD OF TEAS.—We read in the American *Grocer*, of March 10th that the recent Act of Congress, regulating the importation of tea, provides for a Board of Experts, whose duty will be to establish standards of grades: We (*Grocer*) trust tha tthis may provo a success, but our experience in having tea experts fix a standard has not been encouraging. A sample of fancy Formosa Oolong, examined by four of the best experts in the trade. was differently valued by each, there being a difference of twenty and in one instance, forty cents per pound. Tastes vary, one estimating a certain flavour of great value, that another expert does not regard desirable. It is practicably out of the question to fix standards by chemical analyses. Geisler, whose analyses of tea are reliable and extensive, says: "A strict relation between the chemical composition of the tea and the commercial value of the same, is therefore scarcely to be looked for, altough the former would disclose at once that tea which is physiologically the best." There is very great variation in the amount of ash, particularly ash insoluble in acid. The soluble ash in ono lot of green teas varied from 2·02 to 5·019; Congou from 2·88 to 3·52; while the ash insoluble in acid varied from ·32 to 1·31. It is the character of the infusion which concerns the consumer, and not the composition or style of the leaf, and yet these go a great way toward fixing price. Expert tea tasters are governed by strength, body, flavour, aroma and quality of the infusion in fixing value. To adjust standards will require the highest qualifications on the part of members of the Boards of Experts. Unfortunately the tea trade is not over-supplied with high class experts, therefore the Secretary of the Treasury needs to exercise great care in the selection of the seven men who will constitute the Board.

PLANTING IN UGANDA.—It is only seven years since Dr. Peters, the German explorer and agent, found Uganda destroyed by rival factions, and he sought to bring it within the German sphere. It became British, however, and is making astonishing progress. Even since 1894 the imports into the chief town have been more than quadrupled; and the exports have been advancing at a corresponding rate. As the natives of the Uganda kingdom are an advanced race they are offering an ever-widening market for manufactured articles in textiles and metals, including Agricultural implements and industrial tools. Uganda is going to be a cotton, tea, tobacco, and coffee growing country.—*H. and C. Mail.*, March 26.

DATES.—In reference to the notes on Date Cultivation in Australia (*Kew Bulletin*, 1895, pp. 161-2) and Antigua (1896, pp. 26-28) the following brief account of what may be considered the normal growth of the tree will be useful for comparison:—Extract from the Report for the year 1894-95 on the Trade of the Kerman Cousular District, Persian Beluchistan (F.O. 1896, Annual Series, No. 1671, p. 7). Dates grow to great perfection in many parts of the country, notably at Pahraj and Fanoch. The output could be easily doubled by planting fresh palm groves. Date palms begin to yield at three years, and reach their prime at 30. A good crop for a single tree would be from 80 to 100 lb. They are fertilised by hand, one male tree supplying pollen for perhaps 40 female plants. The dates used for export are those that grow at the summit of the tree. From the action of the sun they become hard and dry, thus being easily packed. The lower branches remain soft, and are kept for local consumption.—*Kew Bulletin.*

THE GOLD COAST.—The general fiscal condition of the Gold Coast Colony, as described in a report just published by the Colonial Office, "was not only satisfactory but flourishing" during the last financial year. Revenue and trade increased, although there is no other colony in the Empire so lightly taxed. In the last six years about a million monkeys have been slaughtered on the Gold Coast for the sake of their skins; but the trade is decreasing, because the traders have to go further into the interior to find the monkeys they require. Last year over 90,000 skins, worth over £14,000, were exported. The land in the colony is not generally cultivated, though the soil is naturally rich and will produce almost any commodity. It abounds in the oil palm, mahogany, rubber, and kola trees, and many other valuable woods; but, chiefly on account of the absence of proper roads and the general ignorance of the natives, products which require a careful preparation of the soil and supervision have not been cultivated systematically. On the subject of communications, a passage from an address of the Governer to the Legislative Council is quoted:—"The conditions under which bulky produce is transported from the interior to the coast are such that, beyond a certain distance inland, products have no commercial value; a new producing sphere could be tapped if a railway of 50 or 60 miles in length were constructed, and trade could be further developed by the gradual extension of the line; it is therefore desirable to carry a railway inland from the place best adapted for development as a harbour. What that place shall be is the matter now under consideration." Trade roads also are being constructed and extended. The report concludes as follows:—"The colony has within it all the essentials for prosperity. Rich in gold, in valuable timber, in soil which will produce almost any commodity of trade value, it is already attracting the attention of capitalists, and with finances and trade in a satisfactory state there is no reason why it should not advance in material prosperity and bring wealth to English merchants and native producers and workers."—London *Times*,

PLUCKING, PRUNING AND PREPARATION OF TEA.

(*Continued from page 712.*)

No. XXXVII.

Dikoya, Feb. 18.

I think all teas after a certain age lose flavour, and, unless there are young clearings coming on, the old flavour which younger estates have, cannot be maintained, except in very "*stand-out*" estates.

1. In this district labour is plentiful as a rule. I don't think plucking is coarse, but medium.

2. I do not think *manuring* injures flavour—the fact that the bushes are vigorous ought to give the reverse result.

3. This is *rarely* resorted to : one case I know, when this was done, gave very beneficial results, both as regards yield, and at the same time quality was maintained.

4. I do not consider attention to manufacture has been less careful—but the reverse.

Plucking is very important, and coarse and hard leaf should be carefully kept out of factory ; but plenty of withering room is one of the great points of good manufacture.

5. We have been very well off for labour all the year.

6. I consider the last line of your query, *underlined*, is the chief cause of bad prices ; they know we can't keep teas, and must sell, and won't bid more than they can help. L.

No. XXXVIII.

Bandarawela, Feb. 19.

1. There is, I think, no doubt but coarser plucking has had a good deal to do with fall in prices, the craze in some instances being for a large yield per acre; this combined with supply exceeding demand, is to my mind greatly responsible for the fall in price.

2. I do not think manuring has anything to do with it. A number of estates that never saw manure in any shape or form shows no stand-out prices against those we know that are manured.

3. All teas for some months after pruning are thin poor liquor, whether the pruning has been severe or otherwise. I have not noticed any worse results from heavy pruning in this direction, than when medium pruning was resorted to. Where pruning is very light my experience is the bush throws out an abnormal quantity of bangy leaf, from which good tea cannot be made.

4. My experience is that preparation in the factory receives as much attention as it ever did. No doubt, careless or inadequate factory work would spoil the most carefully plucked leaf; this I consider seldom happens where withering accommodation and machinery is sufficient for requirements.

5. Shortness of labour has not, as far as I know, affected factory work in any way, as all the factories I know of are well equipped with machinery of the latest and most approved type, I have no hesitation in saying Labour difficulties have to a great extent affected quality of leaf. Sunday plucking in the busy months has to be resorted to the quality of Sunday work, no matter how close the supervision may be, is not, as a rule, of a very high order.

6. Over-production and an absence of fresh markets for the increased supply is largely responsible for fall in prices ; in a rising market we never hear of inferior quality. B.

No. XXXIX.

Matale, Feb. 18.

I am of opinion that the fall in price of Ceylon teas may be attributed to the supply being in excess of demand, and that growers have found it pays them better to meet the demand for ordinary teas than to produce the finest teas for which so little has been paid in the London and the Colombo markets.

1. Planters have tried to meet the requirements of the buyers, judging these requirements by the prices they offered for the teas.

2. I am of opinion that manuring improves the quality as well as the yield of the tea, judging by the appearance of the leaf, both before and after it is manufactured, and therefore do not think that manure has anything to do with the fall in price. Though not an expert in tea tasting, I believe our ordinary teas are of as good value now as they were in 1892, only that the buyers won't give the price, as the stocks are larger, and they have no fear of the supply not being equal to the demand.

3. Nothing whatever to do with the fall in price. Severe pruning has frequently been found very beneficial to the tea bushes.

4. Sometimes, want of sufficient withering accommodation has been the cause of our teas not being quite so good as they would have been, had more withering space been available, but on the whole, I do not think less care is bestowed on the manufacture of our teas.

Enlarged and better equipped factories enable the Superintendents to exercise greater care, and produce with less trouble and certainly greater cleanliness, the teas of the present day, when compared with that of the past.

To your within-brackets query, I reply that the most careful attention in the factory, with the finest machinery available, be the individual in charge tea-maker or European Manager, good tea cannot be made from poor or coarse leaf; therefore the first step in the manufacture is careful plucking, and if the leaf be good, the climate and elevation suitable, the manufacture of good tea in most factories is assured.

5. Frequently short labor supply has prevented my getting round the estate with my pluckers in time to pluck the flush at the stage I should have liked to have it; the consequence is, the leaf was larger and did not give the same percentage of the finer teas. I have no doubt had I had more coolies, I would have gone more largely into the manuring question with the proprietors, and almost doubled the yield, but what is the use of producing leaf if you have to abandon the plucking of fields as have been done in this district for want of labor, on more occasions than one? For the present, I think, you have enough of the

TRUTH.

No. XL

Teldeniya, Feb. 19.

I should have answered your first letter on *manuring* dated 26th December, and now I have yours of 12th inst. My views are—

1st. Manuring : I would not advocate it.

2nd. My experience in manuring tea is only confined to the last 6 months of 1896.

3rd. The field I manured never gave more than 260 lb. per acre before manuring. Although good work is being done in America and Russia, the supply is increasing much faster than the demand.

Your letter of 12th inst. :—

In my opinion the teas turned out now are much better than formerly. People have more experience and all the coolies and tea-makers are thoroughly trained. My opinion is that most of the people pluck finer than they did a few years ago.

Severe pruning—cutting low down—adds to the yield but *not* to the *quality* of tea; the tea made from low pruned bushes is not in my opinion so good for a considerable time as tea made from bushes with a good *tap on them.*

I manured 50 acres; it was pruned in January and February and I commenced to apply the manure on 1st July and finished by 15th August: for the year from 1st January to 31st December, it gave 467 lb. per acre for the year, and from 1st July to 31st December, the date on which I *commenced* to apply the manure to the end of the year, the yield was 279 lb. per acre for the 6 months: 10 year old tea on old coffee land. This was the first trial of manuring tea on the estate: this is the result of a carefully kept record.

Now if you advocate manuring of tea with markets as these are at present I should say it would be a case of looking for a millstone to put round one's neck. I would say take what can be got *without* manuring until the demand exceeds the supply and any fields of old tea are falling off in yield. If people all go in for manuring—in place of 119,000,000 the output will soon reach 140 or 150 million—then the question will be the outlet for the extra quantity; there will be more demands for coolies, advances will reach R100 per head and prices will fall still lower.

There is no fault in the factory, the appliances are much better than they were some years ago, and the people in the Factory have more experience. If the leaf is fairly good and *well withered* there is little chance of its being spoiled in after work: the fault is not in the factory.

My shortness of labour supply, as far as my experience goes, has not affected the work either in field or factory. The last, and, I believe, the main cause of falling prices is neither more nor less than *over-production.* 1878.

No. XLI.

Maskeliya.

The market is glutted with tea. Overproduction is the cause of the fall in prices. Were the output to drop fifty per cent, up would go the prices again!

1. Plucking receives as much attention as ever it did. The leaf is no coarser than 8 or 10 years ago. I am sure this cannot be blamed for low prices.

2. Manuring has little if anything to do with it, *if* the leaf is plucked in time.

3. Severe pruning—that is cutting the bushes down to a foot or so—is only done once in 8 or 9 years. The quality of tea made from recently pruned tea is always inferior for 6 months after the pruning, but I can't say that leaf from *cut-down* fields is worse in this respect than from the ordinary pruning.

4. Manufacture is as carefully done as ever it was. Coolies get expert at this work and take an interest in it. Most factories are now very well equipped with machinery, and the withering accommodation, as a rule, is ample.

5. Shortness of labour does not affect the work in the factory, although it does so pretty often in the field during the heavy flushing months; for few estates are so well supplied with labour that an additional force of 30 to 50 coolies would not be welcome in April-May and November-December.

TRAMWAY.

No. XLII.

North of Kandy.

1. Coarse plucking is too palpable a cause in many cases to be disputed; and as this obtains largely in the lowcountry, the proportion of tea from which districts is increasing, the average for the whole island is naturally affected; where hard practical men find it pays, it is ridiculous for critics to condemn!

2. Not enough manuring has been done to affect injuriously the island's average.

3. Severe pruning in the majority of cases is only adopted where thought absolutely necessary—and it affects quality for a year or so after—so that it may *partially* account for fall in prices.

4. A good deal may be debited to half-trained, and badly trained tea-makers, who are far too common. "Ramasamy" well trained often proves more trustworthy; because he'll carry out master's orders and not *think*!

With regard to your parenthetical query here, good tea begins farther back than the field—for jât of seed is important too. But it's like tobacco, care must be exercised right through from seed nurseries to packing and shipment (ex apples!)

5. Not affected here by short labor.

9. *a.* Insufficient withering space when rushes of leaf come in.
   b. Too rapid firing.
   c. Night work and over-heated factories.
   d. Varieties of jât and consequent uneven withering through different textures in leaf.
   e. The *packet trade* at home; no one so far has remarked on this cutting down business.

N B.—Much of the Broken Pekoe of today is Broken Pek. Sou. Ask the brokers about this?

T. KOKO.

P.S.—We have yet to discover what special element in the soil gives flavor and point. Many have noticed in tasting at their factories that leaf from young tea in new land has more flavor than that from old (? or young) tea in old land.

If estates, with new clearings in forest or old chena, would manufacture a separate break from this young tea fields, I feel sure above would be found correct almost universally. Then let the chemist find out what manure will restore the best element to old lands, and let the machinery inventors perfect a cool fermenting chamber, and quality will improve. Saith the cynic: "And the *quantity* of good teas will increase . . . and prices will *not* increase proportionately! So it's supply and demand after all!!"—T.K.

XLIII.

1. Coarser plucking on the part of many at medium and lower elevations particularly, I think, have probably reduced prices and on these estates it is said to pay best.

2. I think it is generally admitted that manuring increases the yield without adding flavor to the teas and perhaps in some cases is thought to reduce t e flavor.

3. If trees are cut down low they are forced into heavy flush at the expense of flavor.

4. Every care should be taken with the manufacture of tea in the factory, but coarse or indifferent leaf cannot be made into fine teas,

but works, field and factory require constant attention to secure good results.

5. Perhaps in some cases shortness of labor no doubt has affected work in field and factory, But this could be made to affect quality or quantity, whichever was deemed desirable by those concerned.

6 & 7. I think perhaps coarse plucking and over-production has affected the market.

TEA BUSH.

No. XLIV.

Nebada.

The three things named, *coarse plucking*, *style of pruning* and *manuring*, tending as they may all do to the production of large yields, must certainly open a wide door for the bringing in of low quality of tea. There can be no doubt that the object aimed at has been large yields. And there is also no doubt that it is only in favoured estates that such yields are consistent with high quality. The temptation of large production is, therefore, at the root of low average prices, because although large crops of poor teas *may* cause overproduction and bring prices to a ruinous level, the fact is that hitherto such crops have been profitable. All other considerations refer to minor points well within the control, and most efficiently controlled, by the generally good management existing in estates, aided by the supervision of competent visiting agents. There is always a high average for high class tea, and the average price in London is but the outcome of the planter's efforts to combine quantity with quality to the best advantage possible in the land he happens to be cultivating. That is what he will always do still, and we must stand or fall by the consequences.

M.

No. XLV.

Feb. 20.

1. Coarse plucking is not more general than formerly—rather the reverse, since more estates manufacture their own leaf in place of selling it.

2. Overstimulating manures have detracted greatly from quality of some 5 per cent of Ceylon estates.

3. Severe low pruning (necessitated by too close plucking and injudicious modes of pruning) has much to do with a falling off of quality.

4. There is, if anything, more intelligent attention to factory work than formerly.

5. Shortness of labour has caused inferior leaf to be brought in during the busy seasons on half the estates in Ceylon.

6. The market being better supplied is more critical of quality. The numbers of factories are not equal to their increased output. Demand is running on the stronger liquoring teas of India. The estates with worn-out soil do not produce as good a quality as when the tea was younger. This applies to a large area of the oldest coffee districts and the parts that have the heaviest rainfall.

M.

No. XLVI.

1. I think, as many, of the large tracts of tea in the lowcountry have gradually and year by year come into full bearing, the yield has been increased, throwing into the markets a large proportion of lowcountry leafed teas than were shipped when only a few estates commenced manufacturing. At times, too, say April-May heavy flushes come on, and then the labour supply is inadequate, and *nolens volens* course plucking has to be adopted.

2. I don't like manuring and I don't think it tends to improved quality; rather the reverse; in an indirect manner, for, if you have not sufficient labour to compete with the increased yield, you had much better leave manure alone.

3. Very possible; severe pruning is very much in vogue, and at the same time the roots are attacked with the mamoty, to say the least, heroic treatment.

4. Without doubt, not enough time is given to factory. Of course, good teas can be, so to speak, made in the field, but these, on the other hand, can be spoilt by want of attention in the factory: more attention wanted, too, to sorting and grading.

5. Personally I have always been well-off for labour, but this is going to be a greater trouble *yet*.

DIKOYA.

No. XLVII.

Feb. 20.

1, 2, and 3. All these mean a certain loss of strength and flavour, especially when combined.

1. Coarser plucking undoubtedly lowers the price by giving a large percentage of lower grade teas and lowering the price of higher grades through mixing in rolling.

2. Manuring tends to weaken the flavour and lessen the strength.

3. This affects prices similarly to No. 2, for say, 6 to 9 months from date of pruning.

4. This, in my opinion, has perhaps most to do with lower average prices.

Yes; careless or inadequate factory work will spoil the most carefully plucked leaf.

5. I do not think it has affected the prices of my teas or factory work, but it has thrown field works back very prejudicially—such works as pruning, weeding, roading, draining etc.

6. Of course, overproduction and increased supply has also largely to do with falling-off in price.

D.

No. XLVIII.

Kandapola, Feb. 22, 1897.

I think the deeper the tap roots get into the sub-soil, thereby deriving inferior nourishment, the poorer the quality of leaf may become. This is only a surmise.

1. There is no doubt that plucking an estate once in 7 or 10 days is productive of a better quality of tea, than if rounds were allowed to run to 12 or 15 days. Coarser plucking may have something to say to the fall in price of Ceylon teas of late years.

2. I do not think manure, if applied once every three years, should affect the quality of tea.

3. I believe that a high bush gives a better quality of tea than a bush pruned down low.

4. Tea is practically made in the field in my opinion, but inadequate withering space or careless work may spoil the best leaf. I do not consider less attention to careful preparation in the factory has anything to do with the lower prices of Ceylon teas.

5. Shortness of labour, on the other hand, I do think may have, and probably has accounted for inferior quality of teas produced, therefore for lower prices.

6. Increased supply in competition at the sales very probably also accounts for the fall in price of Ceylon Teas.

G.

PRUNING, PLUCKING AND PREPARATION OF TEA:

REVIEW OF LETTERS XXIX TO XXXVI.

The number of letters which have reached us on the above subject, and the necessity of publishing them as fast as the exigencies of space permit, impose on us the obligation of passing them in review before they become stale, and emphasizing the points in them which merit attention. We now come to the letters commencing from No. 29. Of the letters which appeared on the former date, three deny coarser plucking and its responsibility for the fall in price—"Planter" from Maskeliya, "J." and "D"; but they admit that shortness of labour tells on the quality of the leaf plucked, and thereby on the tea manufactured with the result that prices are affected. But does not coarse plucking become a necessity when an estate can be compassed only once in 12 to 16 days instead of 7 to 8? There seems to be a consensus of opinion in favour of letting part of an estate go unplucked when labour is scarce, rather than delay plucking and damage the outturn of tea; but practice seems to differ from precept, if not invariably, in the majority of cases; for wherever shortness of labour is felt, it supplies an explanation of delayed plucking and inferior outturn. The fourth correspondent—"E.H.R." from Dikoya—expressly admits coarser plucking, and finds the explanation for it in the tendency of most estates to study the yield per acre, rather than the price per lb. But what is meant by yield? Is it gross yield in lb. of tea manufactured? Or net yield in profits? If the latter, our correspondence columns show that doubt is felt by experienced planters if the larger gross yield means a larger income. If it does not, and if it means even only the same income—the advantage of more restricted plucking is obvious on the ground of a lessened demand for labour, and smaller exports which might induce keener competition and better prices.

On the question of manuring there is no appreciable difference of opinion between the above-named for correspondents. "Planter," while holding that manuring does affect the tea to a certain extent, believes that the leaf of bad jat is improved in softness; and the evil effects of manure are neutralized by the production of a better leaf for manipulation. "E. H. R." believes that manuring can do harm only if there is not labour enough to an estate to cope with the heavier flush it induces. Given the labour, improved prices should follow increased crops. "J." has little experience of manuring; and "D." denies that manuring does harm; but frequent pruning, the last-mentioned condreiss, the chief factor in deterioration. "J." shares that view to a certain extent, as it is months before the effects of heavy pruning wear away; and so does "Planter;" but "E.H.R." does not quite concede the evil. It is an operation which becomes necessary sooner or later, and matters can be so arranged that only a small part of the estate need be subjected to drastic pruning in one year. The bulk of the leaf would thus be unaffected; but if the weak and insipid leaf of the heavily pruned bushes are not manufactured apart, they must even to a small extent, affect the bulk. All four correspondents are agreed on the deficiencies of the Factory, whether as regards accommodation for withering, or attention to details. "J." feels certain that better teas could be turned out with more attention, as some planters "scarcely look at the leaf in the baskets, and certainly do not overburden the factory with their presence." The duties and responsibilities of a tea planter who really seeks to do his best are far from light; but the temptation to leave too much to subordinates, and afterwards to believe that it can do no harm, should be resisted. "E.H.R." while asserting the scanty withering accommodation in most factories puts aside insufficient supervision, as the man who neglects indoor work will neglect outdoor work as well, and will not keep his place long. But is Nemesis always unerring? And until the evil is remedied, is not the mischief widespreading? "Planter" asserts that in 75 per cent of factories, withering space is insufficient, and although bad jât, climate and soil cannot compete with good, justice cannot be done to the best leaf without the needful accommodation. The feeling seems very strong and very general that it is a false economy which denies withering space to factories.

The subsequent letters show similar divergence of statement on plucking; for, whereas "R.B." from Teldeniya and "V.A." deny that there is much, if any, change in plucking, or that it explains lower prices, "J. J." from Dimbula has no doubt that coarser plucking has much to do with lower prices, and "W. N." generally agrees with him. The leaning is towards record yields per acre; and when the Visiting Agent says a certain field must give so many lb. per acre, the Superintendent ceases to be a free agent. The last-mentioned correspondent regards proprietary planters the chief offenders, as they fancy coarse plucking, while superintendents generally pay greater attention to plucking than before. Having had no experience of manuring, he cannot speak of its effects; but the three other writers acquit it of all blame. "J. J." justifies his verdict by the dictum that the healthier a bush is, the better should be its leaf; "R. B." asks pertinently whether judicious manuring can do harm to any cultivation or crop, and whether an answer in the affirmative would not be tantamount to upholding the superiority of exhausted soils; while "V. A.," conceding that manuring may at first give lighter leaf, holds that with the improvement in wood, the leaf must improve in three or four months. Severe pruning is unequivocally condemned by three of the writers, and the fourth says that it is resorted to only after three prunings or so. There is, of course, a difference in practice between up and low country estates—the intervals on the former being three years, while the latter prune every year or eighteen months. On the question of preparation, too, the difference is as three to one. Three of the correspondents deny less attention in the factory, and plead the helplessness of the factory to produce good tea from weak sapless leaf, but the fourth questions due care and attention on the part of superintendents, who leave too much to teamakers who get slack in the absence of frequent visits. The evil influence of shortness of labour in inducing irregular plucking, is admitted even by those whose labour force is sufficient for all wants; but overproduction is regarded as the principal factor by men who may differ on other points. Some hold that teas vary with the seasons and a uniform quality is impossible throughout the year; others believe that age and absence of rest account for much of the deterioration which is inevitable. *Quære.*—Can science do nothing to check this deterioration?

(Letters continued.)

XLIX.

Agrapatana, Feb. 22.

DEAR SIR,—It would need an essay to deal fully with your questions regarding tea prices, the fall in which is probably due to many causes in combination and seldom to one alone.

In the first place, the fall of the Ceylon average is probably due largely to the increasing quantity of low grade teas produced in proportion to the high grade ones.

The estates celebrated for producing high-priced teas have not, I think, lost much in their averages in the London market during the last two years. A slight fall there is certainly, but not a great one, and that fall, I consider, due to general over-production, the supply during the last 12 months being all along rather ahead of the demand.

There is a tendency towards coarse plucking stimulated by the proprietors and their Visiting Agents who are anxious to see increasing yields and by Managers who wish to brag of their great returns per acre; but after all the chief consideration is which method gives the greatest profit and that is frequently a matter of very nice calculation. I am myself convinced that the high-lying estates which have got flavour will pay best by giving most attention to the development of that characteristic and leaving the quantity to take care of itself.

I do not think manuring has affected prices one way or the other. Severe pruning has undoubtedly the greatest possible effect upon quality and I have known several estates at one time celebrated for their high prices lose all the quality which gained them those prices at one blow by pruning down the whole of the tea at once, and the market once lost is not easily regained.

The dominant factors in the production of tea of the best quality that each estate can procure are :—

1. Attention to the constitution of the bush by careful cultivation and plucking.

2. The care given to the kind of leaf plucked.

3. The withering of that leaf evenly and quickly.

If these points are attended to, all the rest of the factory work comes easy and falls into its natural place, and as far as I have seen there is no want of attention in Ceylon factories.

Shortness of labour has probably prevented many estates from carrying out the conditions necessary to secure the best results and few superintendents, I expect, have the nerve to abandon for a time so much of their acreage as they are unable to deal with properly for the sake of maintaining their quality.—Yours faithfully,

B.

No. L.

Central Province, Feb. 22.

DEAR SIR,—In reply to your circular dated the 12th instant I should say :—

(1) The fall in the price of tea during the past 2 years is not due to coarser plucking. The fall previous to this may have been and was, in my opinion, largely due to a change in this direction in several districts where selective plucking did not give the equivalent in price that was lost in yield.

(2) Manuring unless when applied to add quantity to an already over-succulent growth, has not adversely affected quality. When the needs of the bush have been duly considered and allowed for in the manure, there has been a distinct improvement.

(3) I should think there are not two opinions in regard to this. Severe pruning seriously affects the quality of the tea. I cannot say, however, that this is more prevalent now than in previous years. Fields of hide-bound bushes here and there are yearly being treated in this fashion; old coffee-land tea gets more frequent touches of this treatment as the growth generally is more mangy of this class of tea, and more subject to the growth of lichens and other pests.

(4) There is certainly not less attention paid to careful preparation in the factory if anything it is more methodical. There is considerable doubt yet, I believe, as to the best methods of manufacture for any particular estate, and leaf, the many varying conditions of climate, factory position, &c., necessitating variety in the factory methods, apart altogether from the constantly varying claims upon us to meet the needs of consumers. There is a good deal of insufficient factory accommodation especially as regards withering space, and this to the extent prevalent does affect the quality of the tea. Without good leaf fine quality tea cannot be made; on the other hand there is much fine leaf that by no known process of manufacture can be turned into fine quality tea, climate and soil being largely responsible.

(5) Shortness of labour, I should think, does affect the quality of the tea during the rush in April and May; but beyond that taken as a whole there has been no very serious harm from this cause.

(6) In the older coffee districts, the absence of the necessary fertility is a main cause of the inferiority in the tea, and I should imagine it is having its effect in the lowcountry where a forcing climate would naturally tend to draw on the available supply too closely of a soil that is only ordinary in many instances, and produce flushes wanting in some of the essential elements, a most interesting question for the agricultural chemists. Long spells of very wet weather adversely affects tea, being probably destructive of nitrate-forming microbes so useful to all plants whose dominant element is nitrogen.

D.

No. LI.

Lowcountry, Feb. 19.

I think shortness of labour has a good deal to do with fall in price, and incompetent and *unreliable* teamakers; also the desire of big outturns.

Upcountry estates at fairly *high* elevations 4,000 to 6,000 ft., I don't think show much decrease in price, provided they have a good supply of labour, and can gather the flush regularly and systematically. Severe pruning gives weak tea *for a time.*

C.

No. LII.

Dikoya Lower, Feb. 19.

1. I don't think that plucking is quite so coarse as formerly, on the whole.

2. Careful experiments lead me to believe that judicious manuring does not injure quality of liquor.

3. I know numerous cases where prices have gone down without any low cutting or hard pruning.

4. Men never were more anxious than now to produce good teas in their factories; and, on the whole, there never was more pains taken. Of course, the best leaf may be spoiled in factory; but no manufacture can *give* flavour.

5. Shortness of labour has affected work considerably on some estates.

6 and 7. I believe that the chief reason of fall in average prices is greater competition, caused by increased supply. This has been demonstrated in some markets, where the price of fine broken pekoes has gone down to that of pekoe. D. K.

PRUNING, PLUCKING AND PREPARATION OF TEA: REVIEW OF LETTERS XXXVII TO XLIV.

In the batch of letters on the above subject commencing from No. 37, "L" from Dikoya, while claiming that the plucking in his district is medium, not coarse, labour being plentiful, ventures on the statement that all teas after a certain age lose flavour, and that unless young clearings maintain the reputation of the island, the old prestige cannot be sustained except in very "stand-out estates." If this contention, which more than one writer has put forth, be well founded—and it is explained by the absence of any wintering, without which the bush can obtain no rest from the unnatural treatment involved in continual plucking, varied by more or less severe pruning—the outlook for the tea enterprise would be very serious. But the apprehension of steady deterioration of our tea, year by year, is not justified by facts. There are teas, not of one or two estates, but of numbers, which have maintained their position for many years, whose prices have either fallen off but slightly in correspondence with over-production, or been maintained and advanced in the face of diminished competition. If, however, the fear be well-founded, that there must be general deterioration, as the age of the bushes increases, then the question of manuring assumes double importance. Primarily, the object of applying manurial substances to the soil, is to maintain or increase the yield; but if tea —are we not right in saying, unlike other vegetable products?—loses its flavour, too, in the course of time, surely the Agricultural Chemist should at once be applied to, to see if the decadence cannot be arrested and the flavour maintained or renewed. "B" from Bandarawela, on the contrary, feels no doubt that coarse plucking, in pursuance of the craze for a large yield per acre, has contributed to the fall in prices; and "Truth" from Matale leans to the same view, when he says that growers have found it pays them better to make ordinary teas than to produce the finest teas for which the prices are not attractive, while "1878" from Teldeniya insists not only that there is much finer plucking than ever before, but that the teas turned out are also much better, as a result of the larger experience in all branches of the industry which every one has from the cooly upwards. The main cause of the falling-off in price, in the opinion of this correspondent, one need not be surprised to learn, is over-production. He admits, however, that severe pruning spoils the quality, while adding to the yield, but the factory appliances he considers much better than before, and the experience of them the greater. He would assign no blame there, but he strongly condemns manuring, as tending to lower prices by increasing the supply and the need for more labour. But, surely, the advantage of manuring is not merely to increase the yield. The health, and even the very life, of the bush, must depend in many places on the renewal of the soil; and as for labour, would it not require more to open up and maintain new places if the old fail to maintain the upply and to respond to the demand? But beyond that, "Truth" is not singular in his belief that as manuring improves the leaf, it improves the quality of the tea as well; and "L" shares that view; while "B" cannot see that it damages the quality.

"L" holds that very severe pruning is seldom resorted to, and when it becomes necessary the result is wholesome; "B" shares this view to a great extent; and, while admitting that thin liquor follows pruning, whether medium or severe, for some months, has observed that the effect of light pruning is an abnormal quantity of bangy leaf. "Truth" acquits severe pruning of responsibility for bad prices, and "1878," like most planters, admits that the poor quality is only a temporary result. We have seen that the last-mentioned has no fault to find with the factory; "L" denies less care in the factory, and claims that it is greater; "B" is of much the same opinion, provided the accommodation and machinery are adequate to the wants of the estate; and "Truth" follows to the same effect, while insisting that the best machinery and the closest attention cannot produce good tea from indifferent leaf. Bad leaf may be due to weak bushes, but it is often explained by shortness of labour, which prevents "Truth" from asking for manure; for, as it is, he cannot get round the estate even with the flush.

"Tramway" from Maskeliya denies coarser plucking, or carelessness either in the field or the factory: he acquits manuring of responsibility for the fall in prices, where there is labour enough to meet the rush of leaf; severe pruning, down to a foot or so, he considers necessary only once in 8 or 9 years, and its evil effects on quality are transient; but he lays all the blame on overproduction. Reduce the output, he says, to 50 per cent, and the prices will go up. It would seem to follow that, in his view, extension alone explains the excessive supplies he deplores. This view is not shared by "T. Koko," from the North of Kandy, who declares that coarse plucking, especially in the lowcountry, is too palpable a cause of low prices to be disputed; and if it pays it is not likely to be abandoned. Its remuneration is precisely the point about which practical men differ—the *non placets* asserting that the extra cost of labour, the withdrawal of labour from cultivation, wear and tear of machinery, cost of packing and transport, and the prospect of higher prices for better tea and smaller supplies, do not enter fully into the calculation. Manuring and severe pruning (except temporarily) are held free from blame; but half-trained and badly-trained tea-makers are held accountable for bad tea; while bad jât, insufficient withering space, too rapid firing, uneven withering from mixture of jâts and heated factories contribute to the fall. The responsibility of the packet trade for the fall is not easy to understand. Is its immediate effect not to promote consumption? And an enhanced demand should aid prices; but that the Chemist should find out what gives pungency and flavour to the tea, is a suggestion which has our ap-

proval; for, we cannot believe that science cannot restore to a plant, through its food, the qualities it loses through exhaustion of the soil. "M" from Neboda and "Tea Bush" regard coarse plucking at medium and low elevations, and the ambition for large yields of tea per acre, responsible for low prices; but the practice is claimed to be profitable. If it is found to be so, it is unreasonable to expect its abandonment; for, it is on the real remunerativeness of the industry, and not on the reputation alone of the teas, that its continuance and development depend. If "Tea Bush" is correct in his opinion that manuring increases the yield, without adding to the flavour of the teas, and indeed while affecting it prejudicially, the necessity is all the more urgent of ascertaining whether the drawback cannot be remedied. If it cannot, the deterioration must continue, and the factory can do but little to improve teas if substance is lacking in the leaf. On the need of the utmost care in the supervision of the factory, there is as little divergence of opinion, as on the need of ample withering space and cool surroundings. Even those who assert that coarse plucking and large yields find favour because they pay, admit the probability that they may cease to be remunerative; and if quality becomes an object, the reform must begin with the soil, and it is not too early to start the investigation of the influence of soils and manures on the strength and flavour of the liquor.

(Letters continued.)

No. LIII.

DEAR SIR,—With reference to your queries as to the causes which have brought down the average prices of Ceylon teas:—

(1). That coarse plucking is one of the causes cannot be gainsaid. We see by the Colombo tea sales lists, lots of stuff sold at 8 cents and 9 cents—that proves coarse, if not careless, plucking. A greater cause of the low average, however, is, in my opinion, the much greater proportion of lowcountry, and, of course, inferior quality coming into the market.

(2). Manuring, if we know what to apply, ought to improve quality and thus raise the average. It is a well-known fact that the flavour of fruits is much improved by scientific culture, (for instance, the grape or pine-apple), and if fruits, why not leaf?

(3). Excessive cutting down (a pernicious system fortunately fast dying out) though it reduces the quantity, also reduces the quality for many months, and must contribute to lower the average.

(4). There is not, as a rule, the same watchful care over manufacture that was years ago. There are too many meets now to prepare for and attend. Large rollers do not make such good teas, nor so fine in appearance, as the smaller ones; but as this bears on fine and coarse alike, I do not see that the average should be much affected. There is much truth in the saying, that good tea is made in the field, but unequal withering or over-fermenting will turn out low grade teas, however fine the leaf.

(5). I have no personal experience of shortness of labour.

(6) and (7). That rubbishy stuff that goes in Colombo sales at 8 cents and 9 cents (largely the result of careless plucking though sometimes of shortness of labour) should be consigned to the manure heap, or the boiler furnace, instead of going to depress our already very low average. —Yours &c., M. D.

Extract from a letter written a good many years ago:—On many estates pruning seems to have developed into a ruthless hacking down of the bushes which only their natural hardiness, their still being young, their strong deep feeding roots together with the finest of climates, enable most of them to survive and rally in spite of this execrable treatment erroneously called pruning. In the lowcountry I have seen beautiful fields of tea made very patchy in one year by this fashionable cutting down. Many bushes were killed outright. The half-dried stumps of many more, never regained their former luxuriance. This sort of hacking down is even more common in the hill country, though, attended with fewer fatal results.

At this present time you would not have far to go in some of the finest districts without seeing beautiful fields of four feet across tea bushes, being ruthlessly cut down with knife and saw to a few thick sticks, representing nine or twelve inches breadth instead of four feet. When you take into consideration the enormous quantity of material in excess of what is necessary thus cut down and thrown to waste, the shock to the bushes, likely to kill a number and render many others stunted and feeble, the time that must elapse before these thick leafless sticks can grow to a fair-sized plucking bush again, and the draft on the soil to make up the waste,—tell me if you can, good Messrs. Editors, *C. O.* and *T. A.*, a single good and justifiable reason for such cutting down as that alluded to? Also tell me how many hardwooded bushes you know in the vegetable kingdom that would live and thrive under it?

As tea gets older this wholesale, wasteful and destructive system will become more transparent and those who practice it now will discover their error with regret some day, or I am no.—ARBORICULTURIST.

[In pruning, as in most other matters there is, we suppose, a *via media*. We know that years ago Indian visitors strongly denounced the Ceylon system of pruning, on the grounds now stated. But somehow the system has been successful. In the case of jat approaching China, wonderful results have been obtained from low pruning and where high jat bushes have been plucked for a long period, or have run into seed and become scrubby, careful and experienced planters will act on the principle that to enable such trees to recover they must cut low,—down to a foot, say, instead of the orthodox eighteen inches. Will some of those who believe in and practise low pruning favour us with the philosophy of their system?—ED. *T.A.*]

From an Indian paper we quote:—

There *are* many who still use a murderous looking weapon, more like a billhook than a pruning knife, both for light and heavy pruning, but I think there is little doubt that the yield of their gardens would be increased by the introduction of small knives and careful pruning.

To begin, taking my own experience in three districts with new and old cultivation, and in a fourth with old cultivation only.

I have left the plants to grow till three feet high, and then plucked all above that height, and then the season after that pruned them down below every branch, in no case leaving more than 10 inches above the ground. The plucking over the 3 feet tends to thicken out the stem and strengthen the roots; while the cutting down so low forces the plant to throw up a number of stems from its roots *while these are young*; later on they will not sprout so readily.

The next year it will be found that there is already some breadth on the bush, and cutting 6 or 9 inches above the first year's cut and *leaving* 3 inches of new growth in succeeding years the bushes will both grow and yield well. I have always found those cut down lowest in the first year make

the dest bushes in the end. Being by habit a tree, the most of the strength goes to the original stem if left long.

This style of pruning must be supplemented by very careful plucking at the beginning of the season, so that in the 3 inch new wood left there will not be a "plucking knot," this being *the* fatal thing to leave in a bush.

Now all this looks very simple, and the men using big knives and slashing across the bushes at a particular height for all of them, will argue that they cannot go wrong if they use a measuring stick, and cut to that every year, but not being great little tin gods, we cannot insist on each bush growing to order, nor can we be absolutely certain that every one has been correctly plucked, neither can we be sure that in the slashing a little too much or a good deal two little wood may be cut.

Year by year the bushes alter their character, though apparently having the same treatment. Now comes in the necessity for small knives and discriminating pruning.

This pruning can best be done by the women, and indeed *they* have the most interest in it as soon as they are got to understand that on their good work depends the amount of leaf got in the season. On my garden I have certain lines called by certain women's names, that have been pruned badly by tho e women. These lines are kept as "buksis" for them in the plucking season, and they don't like it at all.

The aim of the light pruning is to leave only straight wood, and not too much of that, taking out *all* plu king knots and crow's feet. The small *banjis* inside may be left alone; if they are taken out, the bushes will be just as full of them the next season, showing that some of the strength of the bush has been wasted in reforming them, and besides they form a protection to the bark from the sun. Neither should t e leaves be taken off as they (with the small *banjis*) are the lungs of the plant, and stripping the bush only renders it more liable to disease. Pruning and plucking give shocks enough, without any necessity for emphasizing them.

LIV.

Dimbula, Feb. 24.

(1) Would you say how far you think Coarser Plucking of Leaf may have had to do with it?—More care is taken to secure good leaf now than was formerly the case, so this is not one of the reasons.

(2) Or the more prevalent attention to manuring tea?

In my opinion artificial manure does destroy "quality" in tea, while increasing quantity; but it has not been universally used. Many estates which have had none, and on which the management and style of manufacture remain unchanged, have nevertheless had their prices drop of late; so in addition to manuring there is some other agency at work.

(3) Or severe pruning—cutting the bushes too far down?

Severe or constant pruning is, in my humble opinion, a fatal error, and has possibly done as much to bring down prices as anything outside the factory.

(4) Or less attention to careful preparation in the factory?

No. The tendency seems to be to give manufacture a good deal more attention than it formerly got, but yet a large amount of poorly made teas is constantly put on the market, and the reason for this will be found among the following:—

I.—Want of sufficient factory room on machinery or both.

II.—Stinginess of Proprietor or Agent in not allowing sufficient funds to secure a suitable teamaker.

III.—*Cheap* and therefore inefficient management, and cheap and nasty work to suit estimates framed by, say, Messrs. Jabez Barabas & Co., who want to show their "friends" how *economically* everything is done on Pitchi Kadu Tottum.

IV.—Inability on the part of the V. A. or Boss to give the young Superintendent a practical lesson in teamaking or show him his errors and how to make the most of his tea.

V.—Want of encouragement to Superintendents. It seems strange at first sight that proprietors should be willing to let their tea suffer from any of the above-mentioned and easily preventible causes, but still many do so and the result is as might be expected. One can only suppose that absence from Ceylon or ignorance of the conditions necessary for producing a high-class tea prevent their grasping the true situation.

The day cannot be far distant now when it will be recognized as it should be, that the manufacture of high-class tea is, like brewing, work for an expert and that an estate Inspector is *worse* than useless unless he be a practical planter of wide and real exprience—a trained taster and tea expert, and possessing a thorough knowledge of all machinery.

5. I should say a shortne s of labor would affect prices to some extent, but not so much as shortness of factory room for instance.

6. A favorite complaint of some Agents is that tea "though well made, is not suited for the market," and if this is the case, agents should keep their Superintendents well posted up in what is wanted and so secure teas suited for the market and maximum prices for proprietors.

To sum up:—I think the deterioration of our teas arises from various causes, viz:—

Age.—We cannot make such a good article from bushes over 12 years as under. *Manure* as I have stated. *Severe pruning*. *Bad manufacture* from the causes mentioned.

B. P.

No. LV.

Balangoda, Feb., 25, 1897.

I do not think that either common plucking, manuring or pruning has much to do with lower averages. I think the chief reason is the larger area of low-grown tea now coming in, as compared with previous years, also the much larger quantities that have to be passed through small factories without sufficient power or machinery, and in consequence less carefully made. Rush of leaf and insufficient labor also all tend to lower averages.

Good leaf can most certainly be spoilt in factory.

No. LVI.

Central Province, Feb. 25.

DEAR SIR,—In my opinion the recent falling off in quality and consequently price of Ceylon tea is greatly due to insufficiently equipped factories, so far as both machinery and withering accommodation are concerned, especially the latter.

Very many estates in Ceylon have of late years been manured and in many cases the yield has increased from 350 lb. per acre to 500-600 lb.

This large increase has been manufactured in the existing factories, which, although when built were ample for the requirements of the estate are now quite unequal to dealing with the greater quantity of leaf.

Although I am convinced that superintendence in the field is very necessary, I am equally sure that were more time spent in the factory, and the responsibility of manufacture not left so entirely in the hands of underpaid native tea-makers, the Ceylon average would not long remain at its present low level.—Yours, etc! G.B.K.

PLUCKING, PRUNING AND PREPARATION OF TEA.

REVIEW OF LETTERS XLV TO LII.

The letters, commencing from No. 45 disclose similar differences of statement on the question of coarse plucking to those already noted. "M" denies that coarse plucking is more general now than formerly—thereby implying that it has always been prevalent to a considerable extent; and he inclines to the view that plucking is finer now, and grounds his belief on the circumstance that more estates manufacture their own leaf, in place of selling it. But he admits that shortness of labour results in the plucking of inferior leaf, especially in busy seasons, on quite half the estates. "Dickoya" believes that lowcountry extensions, which are coming into full bearing year after year, have thrown into the market larger quantities than ever of coarse teas; and when heavy flushes come on, about April and May, an inadequate labour force compels coarser plucking. "D" asserts the combination of coarse plucking, manuring and heavy pruning, as tending to deterioration; while coarse plucking by itself accounts for a larger percentage of low-grade teas, and the lowering of the price of the higher grades, through mixing in rolling? "G." from Kandapola, while admitting coarser plucking, and the evil influence of longer intervals than 7 to 10 days between pluckings, advances the theory that the deeper the tap root gets into the subsoil, the poorer the nourishment it provides the bush with; and that tells on the quality of the leaf. But do not the principal feeding roots radiate from the stem, and should not manuring, judiciously applied, counteract the evil effects of an aging bush and inferior subsoil? By judicious application, we do not mean only the provision of such constituents as the bush needs, with reference both to the treatment it undergoes and the character of the soil, but also the manner of applying the manure without needless injury to the roots which would aggravate the shock caused by continuous plucking. "G." disbelieves in any injurious effect on flavour, caused by manures, if applied once in three years. "D." on the contrary holds that "manuring tends to weaken the flavour, and lessen the strength of teas; but no reasons are alleged for this opinion, and we fail to see how treatment which is calculated to give tone and strength to the bush, can weaken the liquor drawn from the leaf. Injury to the flavour, by making it coarse and unpalatable, is intelligible, though it remains to be established that this result follows necessarily from the application of manures, whatever their constituents, and if it does follow that it is not transient. "M." and "Dickoya" believe in such deterioration, but we should prefer to suspend our judgment until chemical tests have supplied data on which one could safely proceed; but manuring, as tending to produce leaf beyond the competency of pluckers, is quite another matter, and the experience on all estates cannot be the same. Severe pruning is condemned by all four writers, as telling injuriously on quality, while two expressly state that a high bush gives better tea than a low pruned one. "M." asserts more intelligent attention to factory work than before; "Dickoya" holds quite the opposite view—that not enough time is given to factory work—and he is supported by "M." who thinks less attention to preparation has perhaps most to do with disappointing prices; but "G." denies this, while holding inadequate withering space responsible for much harm. And there follow some suggestive letters—notably those by "B." from Agrapatana, and "D." from the Central Province. The former recognises the increasing proportion of low-grade teas, as one of the many causes that have contributed to the decline in prices, which, he affirms, is very slight in the higher priced teas. His contention supports our refusal in our last article to accept the theory of a natural deterioration of our teas from the age of the bushes; for, not only does he appeal to figures in proof that the fall in good teas is but slight, but he points out that that fall is easily explicable on the ground of over-production. While saying thus much, he has observed a tendency to over-plucking, stimulated by proprietors and Visiting Agents, anxious to see increasing yields, and by Managers who boast of returns per acre. "D," on the other hand, denies coarser plucking, though it operated at one time in places where selective plucking did not make up in profits for loss in yield. As "B." says, it is often a matter of nice calculation, whether coarse or fine plucking pays better; and we agree with him that high-lying estates should not sacrifice flavour to yield. "C." ranges himself with "B." in the view that the fall in price in teas from high elevations is slight, when labour is not scarce. Scarcity of labour, he thinks, has a good deal to answer for, and so with "incompetent and unreliable tea-makers," and the desire for big outturns; while severe pruning gives weak tea only for a time. "D.K." agrees with the previous writer on the evil influence of short labour, and so do "D." and "B."—the last-mentioned adverting to the courage necessary in a superintendent to abandon plucking on a certain acreage, in order to maintain quality. Clearly, that is a matter in which the responsibility should rest on the Visiting Agent or the proprietor himself; but, then, the superintendent would be relieved of the responsibility of maintaining an adequate labour force. With the alternatives before him of a deficiency in the estimated yield and a falling-off in quality, the superintendent wil more fully recognise the need of exercising the greatest tact and judgment in keeping together his labour force without encouraging reckless advances.

On the question of manuring, "B." denies that it has told on prices; while severe pruning, to his knowledge, when carried out too freely over an estate, has so affected quality, as to render recovery of the old reputation difficult. "D." holds the same view on manuring, except when over-succulent growth has been further sought to be stimulated. When the needs of a

bush have been duly considered, there has been a distinct improvement in quality; and careful experiments by "D.K." have led him to the conclusion that manuring does not spoil quality. "B." summarises effectively the requirements of the day, in (1) attention to the constitution of the bush by careful cultivation and plucking; (2) care as to what leaf is plucked; and (3) even and quick withering. If these are attended to, factory work is rendered easy; and he has observed no want of attention in factories. "D." agrees in this; but thinks the requirements suited to varying conditions of climate, position of factory and the needs of consumers, are little understood; while insufficient accommodation is a considerable grievance. "D.K." too, testifies to the attention bestowed in factories. The views expressed by "D." on the absence of fertility in old worn-out soils, and the forcing climate of the low country, render authoritative advice on manuring, such as Mr. John Hughes tenders on the next page all the more urgent.

(*Letters Continued.*)

No. LVII.

Maskeliya Feb. 13.

(1) Coarser plucking *does not* affect the drop in prices; *for all grades*, coarse and fine, have gone down equally—indeed, if anything, the finer grades most.

(2) Neither does manuring affect prices so far as can judge and I've done a good deal.

(3) This, in my opinion, does so. Low severe cutting down especially so, and *too frequent* prunings. This is an easy and simple method of *increasing* your *yield*; but it is long ere the *wood matures* sufficient to give a good class of tea.

(4) Far better and more elaborate machinery is now used in factories and much more (may I call it) scientific tea making brought to bear on the manufacturer now than of old: so I can't see well, how it could be from less care, speaking *as a whole*, that prices are affected. Of course, well-plucked leaf *may* be spoiled in factory, but this would apply to isolated cases only. Given a reduced output all over the world, prices would jump at once

5 This last remarks under No. 4 applies twice.

6. Overproduction and the usual law of supply and demand are the factors.

See Kandapola tea and prices; as a rule, they allow the bushes to run as long as *3 years unpruned.* The wood is old and well matured, and produces good liquor. I don't say this is possible everywhere—unfortunately, it is not so.

W. A.

No. LVIII.

Agrapatana, Feb. 27.

1. On some estates at lower elevations there is no doubt that coarser plucking has influenced the prices of tea, but I do not consider that at higher elevations the tendency has been to pluck coarser, but in many cases, the reverse.

2. I have never found manuring affect the quality of tea at this elevation, but that it rather improves it, if properly and judiciously done, though, of course, in certain soils and climates indiscriminate manuring may give yield only and reduce quality.

3. I believe severe pruning to be less prevalent than formerly and that, on the whole, more care is taken in this work.

4. I consider there is room for improvement in manufacture and, in some cases, want of more machinery to prevent night-work or more room for withering. With the rapid increase in acreage opened for tea, there has been corresponding increase in number of factories, and the necessary experience has been often missing to keep up with all this. Good tea is made both in field and factory and to show good results, and give good profits there should always be experienced management in the field and supervision by those who know how to make the most of this in the factory and direct those there.

5. At certain times of the year when the "rushes" come on, shortness of labor would, of course, affect the work in field and factory. It has not been so in my case, as I have always had sufficient supply of labor. But I know, that in some cases with all this increased tea coming on of late years, this has seriously affected the quality of the tea, but to what extent generally, I cannot say. As a matter of fact, I do not believe that the tea, made of recent years, has been worse than previously, in any well-ordered factory. I believe that I make better teas than ever I did and yet get lower prices. This is corroborated both by local and home reports on the teas, and I have no doubt very many others have found this to be the case. Is it not a fact that actual profits on estates per acre have been larger on most estates with increased yields, &c., than when highest prices ruled, and would it not be so now if exchange had not risen, and allowing for increased prices paid for estates, and it is for each one to find out what gives best profits per acre, allowing liberally in factory for all machinery and manufacture to secure best prices for leaf received there, and in field, for proper cultivation to keep up quality of leaf on trees. W. B. J.

No. LIX.

North Matale, Feb. 27.

(1) Overproduction more than anything.

(2) Have no experience in manuring tea—so did not answer first letter.

(3) Would not think so.

(4) Do (agreed).

(5) In a rush of leaf, the tea cannot be so good as generally we are then short-handed.

(6) No. M.

No. LX.

Rangala Feb. 16.

Manuring in this (medium) district very little; and only this year is one estate doing a good deal with artificial.

Re yours of 12th instant.—(1) I think bad and coarse plucking is one of the primary causes of Ceylon teas being so low in price. (2) and (3). With careful work, this has little to do with it. (Manuring may take off flavour, this I'll be better able to judge 12 months hence.) (4) *Manufacture.*—Want of care and attention has a great deal to do with poor teas.

Many factories are left to the charge of some cooly or teamaker, who is equally ignorant of the first principles of manufacture of tea. Green leaf comes to factory from fields and in a few days it is manufactured by rule of thumb into so-called tea and soon despatched. How some I have seen, finds a sale, I can't think. Such is the history of tea manufacture in a few factories I know!! S.

THE MANURING OF TEA ESTATES.

We have much pleasure in laying before our readers the following valuable review by Mr. John Hughes of the series of letters on Manuring of Tea which recently appeared in our columns. Mr. Hughes complains in a private note that many of the replies we received to our questions are rather vague and general, no details being given of actual results and cost as compared with increased yield. Such figures are absolutely necessary to the formation of a practical opinion for future guidance. However, Mr. Hughes enters very carefully into the whole question and his facts and figures, as well as practical counsel, cannot fail to be of much service to all careful and thoughtful tea planters in Ceylon and elsewhere. The Report is as follows:—

By the last mail the writer received a request from the Editor of the *Tropical Agriculturist* to review the 61 interesting communications that had been forwarded in reply to the Circular issued, asking for detailed information respecting the extent to which Manure had been applied to tea.

The general character of these replies appears to indicate that manuringe is becoming much more general upon old estates, where tea has been substituted for coffee, but that upon really good soil and upon new estates, it has not yet been resorted to. This is quite what should be expected, and also shows the importance of considering the quality or chemical composition of the soil before incurring unnecessary expense.

In this country as recently as last summer in the potato experiments at Reading on Messrs. Sutton's trial plots, we had an illustration of the folly of applying certain manures to soils already fully supplied with phosphoric acid and potash. The increase in yield did not pay for the increase in the cost of production, and consequently was unremunerative. Therefore, beore commencing any expensive system of manuring tea estates, it is essential to ascertain in what respect the soil needs assistance whether in regard to nitrogen, potash or phosphoric acid; for, in regard to Lime, we need not trouble to make inquiry as it is not specially required for tea.

Many of the writers of the replies state in a very positive manner that they would not think of manuring tea on good soil, and they are quite right both *practically* and *scientifically*.

It is rather curious to notice that some planters state that they object to manuring on the ground of fearing over production. One can understand the objection being raised upon the ground of want of labour, but it seems a novel idea to fear overproduction in a country where new estates are constantly being opened up. Whether manuring should be resorted to or not resolves itself into a matter of cost. In estimating the value of the increased yield of tea, it is however important to remember that it is not the *gross*, but the net extra value of the tea made that should be put against the cost of manuring. This was pointed out by the writer when reviewing the results of the manure experiments recorded in Mr. Bamber's book. Thus, if the ordinary yield of 400 lb. made tea per acre be increased to 600 lb., we must deduct the cost of picking, making, packing and carriage to the seaport, and not simply calculate that 200 lb., if sold in Colombo at 40 cents per lb., would realise R80.

At present it appears that manuring consists of two kinds, *bulky* and *concentrated*; the former being represented by cattle-dung and line refuse, and the latter by bones, fish and castorcake. The last mentioned are described somewhat erroneously by certain planters as *artificials*, though nothing can be more natural than the remains of animal or vegetable productions as natural fertilisers. These three fertilisers are valuable according to their richness in phosphates of Lime and Nitrogen per 100 parts as follows:—

	Phosphates.	Nitrogen.
Bone Meal	50 to 53	$3\frac{1}{2}$ to 4
Fish Meal	14 to 18	6 to $7\frac{1}{2}$
White Castor	4 to 5	7 to $7\frac{1}{2}$
Brown Castor	3 to 4	4 to $4\frac{1}{2}$

It will be noticed that bones are highly phosphatic with comparatively little nitrogen, and that castor, especially the superior white quality, is highly nitrogenous and only very slightly phosphatic, while fish, which is often of very variable quality by reason of adulteration with sand, occupies a medium position.

With the aid of the local Analyst in Colombo, planters can always protect themselves at a slight cost against being imposed upon by the delivery of inferior materials. Sellers soon find out whether manures are subject to a careful and systematic examination by analysis, and will not run any risk with prudent buyers, for it is the careless and thoughtless buyer that is usually imposed upon.

Manuring will have to be done judiciously (if it is to be profitable), regularly and in small quantity, adapting the kind of manure to the requirements of the soil. If nitrogen only is required, castorcake, well crushed, will be one of the cheapest and most suitable. If phosphoric acid, so essential to the production of a quick growth of leaf, be required, a mixture of bonemeal and superphosphate may be advantageously applied. If potash, the dominant mineral element in the ash of the leaf, be required, potash salts in the form of sulphate of potash should be supplied.

The use of nitrates, whether as nitrate of potash or as nitrate of soda, which apparently have been applied to a limited extent, should be discouraged, because of their great solubility and the known heavy rainfall of Ceylon. These salts readily dissolve in their own weight of water, so that their application must be attended with great risk in a country in which the rainfall is sometimes as much as 23 inches in 24 hours.

In this country, nitrate of soda is perhaps the most economical, concentrated, nitrogenous manure that can be employed upon spring sown crops, which have only a few months to complete their growth, and under a rainfall of only a few inches per month. The same remark may apply to the use of sulphate of ammonia and also to Peruvian guano, both of which are too soluble to be used in any quantity in tea fertilizers. Those acquainted with the hilly districts upon which tea is grown in Ceylon are aware of the terrible destruction caused by wind and wash and that the preservation of the original surface soil should be the first consideration of the careful superintendent. The richness of a soil in humus or vegetable mould is indicated in ordinary soils by the richness in nitrogen: the best Ceylon soils contain as much as ·50 in 100 parts of dry soil, while the poor soils contain only ·10 of nitrogen per 100 parts of dry soil. And as every ·10 per cent represents in round numbers 2 tons per acre to the depth of one foot, it will be understood that the difference between the accumulated fertility of one soil in respect of only one constituent, namely nitrogen, as compared with another soil, may vary as much as from 2 tons to 10 tons.

In the reply, marked 60, figures are given showing the effect of manure upon different plots of old coffee land 35 years old now in tea.

					per acre.
	lb.	lb.	lb.	lb.	lb.
Before Manuring	201	304	143	188	305
After Manuring	425	726	310	317	637

The writer states that "the experimental handling of artificial manures has given castorcake and crushed bone the laurels and realized nearly 100 per cent increase." This, however, is only the gross increase and we should like to have the nett value of the increased yield of tea, also the cost of the application of the manure before deciding whether to repeat the dressing the next season. These experiments are very useful, so far as they go; but for general guidance and to afford practical information, it will be necessary to furnish further details. The composition of made tea naturally varies considerably: in the first flush and young leaf there is more potash and phrosphoric acid with but little lime: but as the leaf becomes older and larger as well as coarser, the figures for potash and phosphoric acid decline, while those for lime increase. According to the writer's analyses 500 lb. Ceylon pekoe souchong removes:—

Organic Matters	..	441 lb.
Mineral Matters	..	29 ,,

The organic matter includes 19½ lb. of nitrogen, while the mineral matters include 11 lb. potash, 4 lb. phosphoric acid and 3 lb. lime.

These figures indicate the importance of bulky organic matter containing about 4 per cent of nitrogen and 5 per cent mineral matter. Hence the various kinds of crushed cakes naturally supply a manure specially adapted to the requirements of tea. If the freight would permit, it would be possible to send an excellent specially compounded manure direct from this country, and thus do away with the chance of local adulteration. To some extent this has already been done by planters who reside at home, and as several subsequent shipments have been made, the crop results extending over three years may fairly be assumed to be satisfac ory. But in preparing any such special manures, it is essential, first of all to ascertain what the soil already can supply itself, and in what respect it requires assistance; otherwise the manures cannot be expected to be economical.

If the Railway authorities would enlarge the statement of their traffic returns and arrange that the quantities of bone meal, crushed cake, dried fish guano, superphosphate, chemical manures and nitrates were separately tabulated, very valuable information would be afforded to owners and managers of estates, as well as to those interested in the sale of such materials.—JOHN HUGHES, &c., District Agricultural Analyst for Herefordshire Analytical Laboratory, 79, Mark Lane, London. E. C.

THE INDIAN TEA INDUSTRY: PROPOSED CENTRAL RECRUITING AGENCY.—A meeting of representatives of the Tea Agency Houses was held at the Bengal Chamber of Commerce Rooms, Royal Exchange, to consider a scheme for the formation of a Central Recruiting Agency. There was a good attendance, and the Hon'ble Mr. Playfair occupied the chair. The Chairman stated, among other things, that the "annual outlay for importing labour the Chamber of Commerce estimate at R45 lakhs." —Prodigious R4,500,000!—and this amount, we take it, not in "advances" to be recovered, but all irrecoverable.

VARIOUS PLANTING NOTES.

THE PROCEEDINGS OF THE AGRI-HORTICULTURAL SOCIETY OF MADRAS for the last quarter 1896. This is no temporary body, but an established institution of 62 years' standing. We note that H.E. Sir Arthur Havelock is its present President. As might be expected, these proceedings show that a good deal of impor tant work of a special character is being done and we can only regret that we have no similar institution in Ceylon to look after the interests of Agri-Horticulture in the Colony in a thoroughly business-like way.

TEA CULTURE IN MAURITIUS.—We are pleased to receive a letter from an old Ceylon planter with varied travelling experience like Mr. E H. Edwards. A rumour, indeed, had reached Ceylon of his death and talking of coincidences, only yesterday did a Colombo merchant remark to us on his final disappearance, and behold, this morning's post shows that he (Mr. Edwards) is still in the land of the living, while he reports another ex-Ceylon planter, Mr. Cor on, as very sanguine of the success of tea culture in the sugar island. We should have supposed that "sugar" would pay too well in a silver-using Colony to make it worth while to go after tea; but the growth of a certain quantity of leaf for local sale and consumption ought to be profitable.—As for Mauritius rivalling Ceylon,—pooh!

THE DALUKOLA TEA COMPANY, LIMITED, may be congratulated upon their happy idea represented by the very handsome and taking Tin which they are issuing in commemoration of Her Majesty the Queen's record reign. It represents a golden sovereign, is about ten inches across and 1½ inches deep. The die is most excellently well cut, and faithfully reproduces the coin. The metal is the very finest steel plate; this was found necessary to stand the tremendous pressure of 20 tons in the hydraulic press in which the figure of the Queen's head is embossed. The work is executed by the foremost English firm in this class of work, and the result does them the greatest credit. The tin, filled with tea, retails at 2s, and will make an attractive window show. Over 30,000 of these tins have already been sold.—*Grocers' Journal*, March 20.

METHYLATED SPIRIT IN INDIA.—The quantity of spirit methylated in Bengal last year shows a considerable increase In 1894-5 it was 54,282 gallons; in 1895-6 59,854 gallons. Methylated spirits are, of course professedly imported or prepared for use in arts and manufactures and in chemistry, and in this idea the duty thereon is fixed at a low rate of 5 per cent., *ad valorem*. It has lately been shown, however, that spirit methylated with wood-naphtha can be manipulated into a drinkable spirit, and the Bengal administration have therefore taken under consideration a scheme for denaturing the spirit in a more effective way. The medium with which the spirit is to be rendered "completely and permanently unfit for human consumption" is "caoutchoucine," with which it is to be mixed. A horrible sort of eau-de-Cologne used once upon a time to be made in Calcutta. It was done up in bottles imitative of the well-known bottles of the celebrated "Farina," and the lady new-comer to India, inexperienced in the boxwallah's wares, was liable to think that she had picked up a bargain indeed—until she tried the "perfume" upon her pocket-handkerchief. This country-made eau-de-Cologne, the manufacture of which was formerly carried on to a large extent in Backorgunge, was prepared with spirit made from wood-naphtha; but, luckily, the manufacture of the indigenous eau-de-Cologne has almost ceased, and it is not thought worth while to make it a special matter.—*Chemist and Druggist*, March 20.

TEA REPORTS—AND TEA PROSPECTS.

A leading Colombo merchant said to us the other day that one consolation arising out of the present low prices for Ceylon teas must be the absolute discouragement they offer to the gentlemen or Syndicate who are so anxious to exploit machine-made China teas. With our low country teas selling so cheaply as they do at present, there cannot be much scope for bringing forward China, Japan or even Java teas in competition, and one result ought, therefore, to be to drive out still more China teas from the United Kingdom and Australasia, and to give Ceylon and Indian teas a little better chance of competing with China and Japan in North America.

This mail brings us the Annual Reports on the Tea Market (for 1896) of Messrs. Geo. White & Co., and Messrs. Wilson, Smithett & Co. From the former we quote the list of averages for Ceylon districts for each month, with Nuwara Eliya, Udapusseilawa, Dimbula &c. 9¾d average at the one end and Kurunegala, Polgahawela, Kegalla, &c, with 6d at the other. What is said in respect of "prospects" we quote in full as follows:—

PROSPECTS.

With every indication of a larger demand for British-grown tea from nearly all quarters of the globe, and a gradual extension of the Home consumption, the outlook is fairly favourable, especially as the present scale of values is moderate for all descriptions, and judging from the estimates, supplies from India and Ceylon for the current year, although heavier, are not likely to prove excessive.

It will be interesting however to observe the results of the introduction of machinery and modern systems of manufacture in the produce of China, although it is not considered probable that the amount shipped from that country to Great Britain will be augmented thereby, at all events for some time to come.

The vital point to those interested in the tea industries of India and Ceylon is the price which their productions will realize. The tendency is no doubt to a lower rather than a higher range. Writing on the 18th of March, 1887, we said, "The public has been accustomed to cheap (*i e.*, low priced) tea, and the 1s 8d and 2s canisters have been reduced to 1s 4d and 1s 6d." Even allowing for 2d per lb. reduction in the Duty since then from 6d to 4d per lb., there has been a further marked decline in the retail price, a large proportion going into consumption at from 1s to 1s 4d per lb., while 1s 6d to 1s 8d per lb. is considered a liberal figure for the better kinds.

This tendency to a shrinkage in value, together with a possible higher rate of exchange, makes it more than ever a matter of necessity that the sale of British-grown tea should continue to be pushed in countries other than Great Britain with all possible vigour. Considerable progress has undoubtedly been made as regards Russia and the Continent generally, as well as in Canada and the United States.

To a great extent this result has been brought about by the good work done by both the India and Ceylon Tea Associations and those working in conjunction with them, but it is of paramount necessity that their efforts should be persisted in with even greater stress than heretofore.

From the Report of Messrs. Wilson Smithett & Co., we make the following quotations in the meantime:—

The weight of Ceylon Tea offered in auction between January 1st and December 31st, 1896, amounted to 92,000,000 lb., against about 80,000,000 lb. in 1895 and 74,000,000 lb. in 1894. The Average Price realised for that on Garden account being 8¼d per lb., against 8⅝d in 1895, and 8½d in 1894.

Exports.—It is very gratifying to be able to notice the steady increase in the demand for Ceylon tea from the various extraneous markets. During 1896 the exports of Ceylon were nearly double those of India. The direct shipment from Colombo to Australia and New Zealand alone shew an increase of 2,500,000 lb. compared with 1895 and, in addition to the re-exports from this country, which mark an increase of 1,100,000 lb. or more than 16 per cent. during 1896, compared with the previous year, a considerable quantity has been transhipped without being landed in London, principally for the American and Canadian markets. The Russian demand remains the principal factor in the development of the export trade, important orders from that quarter being now received almost every week in time to materially assist competition at the public auctions.

Quality during 1896 was, we consider, fully up to the average. During the early summer months there was, as usual, a large proportion of dull and pointless tea, but later on a very satisfactory standard was attained, and the October and November arrivals were mostly of excellent quality, combining fine flavour and good strength. Two defects in quality demanding the attention of planters have become much more pronounced of late: we refer to the increasing number of "tarry" and "minty" teas; the former characteristic seems to be attributable to the leaf getting smoked during manufacture; it is easily detected in the aroma of the dry leaf, and often spoils a tea of otherwise good flavour and quality. "Mintiness" is a defect which it is more difficult to locate; high-country teas are chiefly affected by it, and it is most noticeable during the arrivals of the early months of the year; the flavour, which is very pungent and pronounced, closely resembles that on the wild currant or "Ribes" of our own gardens, and has been attributed to Eucalyptus as well as to some small aromatic herb, which it is said the coolies casually pluck. It has this peculiarity, that it does not, as a rule, taint the tea throughout; frequently after one "minty" infusion, which must contain a foreign leaf, the flavour will only reappear occasionally in subsequent infusions.

Our list of estates this year comprises 656 which have sold 20,000 lb. and over on the London market under their own marks during 1895. An asterisk has been placed against those marks, which were either wholly or partially sold in Colombo, as the returns in those instances are, in all probability, incomplete on account of the re-marking of a large proportion of Colombo-bought tea.

The general average realised during 1896 for teas on garden account suffered a decline of ⅜d per lb. compared with the previous year, and a glance at the results we have compiled will show this to be due to the lower range of prices current for common to ordinary kinds, the most important reductions being confined to low country estates, and to those where quantity rather than quality is aimed at; this feature of the market is more clearly noticeable in the results obtained in the various districts. Up-country gardens have, on the whole, well maintained their position, and many estates show a gratifying increase in the value of their produce.

The long list of Estate averages will be given in an early issue; but meantime we may quote a few of the more prominent as follows:—

200,000 to 500,000 lb.
(The three highest averages.)

		About lb.	Av. price per lb. 1896.	1895.
St. Leonard's H	H.	.. 331,500	1s 2d	1s 1d
Campion	H.	.. 280,500	1s 0¼d	1s 0¼d
Henfold	H.	.. 234,500	1s 0	1s 0¼d
100,000 to 200,000 lb.				
Silver Kandy	H. H.	.. 101,000	1s 2d	1s 1d
Goatfell	H.	.. 173,500	1s 0½d	1s 0¼d
Holmwood	H.	.. 140,500	1s 0½d	1s 1d
50,000 to 100,000 lb.				
Bramley	H.	.. 73,500	1s 0	10½d
Carlabeck	H.	.. 87,000	11¾d	1s 0¾d
Tilliconl ry	H.	.. 95,500	11¼d	10½d
Pita Ratmalie	H.	.. 96,500	11¼d	10¼d

		About lb.	Av. price per lb. 1896.	1895.
		20,000 to 50,000 lb.		
Park	H. H. ..	37,000	1s 2¼d	
Excelsior	H. H. ..	23,500	1s 1d	
St. John's	H. ..	31,000	1s 1¼d	8¼d
Ormidale	H. ..	36,500	1s 0¼d	1s 1¼d

Altogether the tone adopted in the London Tea reports is encouraging, at any rate for the immediate future, and it is quite clear that we cannot do better than to go on trying to conquer America and Russia for our teas.

COOLIES FROM NORTHERN INDIA.

LET not "Truth" (whose letter appears elsewhere) begin to crow until he has got his Bengali coolies and found them suitable for his work. "The proof of the pudding is in the eating thereof." Now, we know for a fact that every cooly entering Assam costs the planter R100 a head (irrecoverable) before a stroke of work is done. It will be strange if Ceylon can get coolies from the same region more cheaply.

But we have had an experience put before us gained by a Ceylon planter nearer home in India, which must be commended to the notice of "Truth." A Matale planter applied to a Madras Cooly and Planters' Agency whose advertisement declared their ability to supply coolies at a fixed rate per head. On 21st December last he got an answer that "advances and travelling expenses would amount to R11 per head, which must be remitted with order" besides the firm's commission of R10 per head. On 7th January R420 was remitted for 20 coolies. We have seen correspondence up to 3rd March in which various excuses are given; but we have not heard that the Matale planter up to this date has got either his coolies, or his money back. *Verb. sap.*

MATURATA:

SIR HENRY WARD AS A "V. A."

Recurring once again to the subject of the district that the Governor is about to honour with a visit, we may say that amongst the older planting divisions of the island Maturata has never seemed to us to quite take the position to which it is justly entitled. Looking at the richness of its soil and almost unequalled healthfulness of its breezy climate, one would have supposed that long ere now it would have been in the forefront of popularity. We have known Maturata intimately ever since the reign of the "Roses" on the one side and "Tip Thompson" on the other. Since the days of Robertson on Allecolleweve to the time when the old store echoed the melodious notes of "G.M.B." Ellamulla, with its rich dark loam of unknown depth, is by no means easy of access but once the hospitable bungalow is reached, who could desire a more delightful highland home? On Mandara Nuwara poor Middleton found life was not worth living; yet "W.W.W." could cheerfully hunt the elk by day and dine luxuriously in full dress togs at night. A breezy but rather rough and rugged planting school is Mandara Nuwara, hugging close to the foot of Pedro for shelter; yet we know that Boreas blows there in fitful and unexpected gusts. Albeit, that land of mountain and cloud has turned out some notable men in its day. Here, that favourite son of fortune, "H.J.V." began his planting career; here also, the astute Arnold White, fresh from Leadenhall Street, first learned which end of a coffee stump had to be inserted in the soil.

In 1857 that Prince of V.A.'s, Sir Henry Ward, visited the district and wrote his model report:—

"The Ford, below the Fort, inconvenient at all times, is dangerous, if not impassable, during many months of the year; while the District is rising, every day, in importance from the number of Estates already opened, and the excellence of a large belt of unsold Land, running parallel with Mr. Robertson's Coffee Plantation, the superior quality of which is admitted by the best judges. I know no part of the Island, in which the two great branches of Ceylon agriculture may be seen in such close juxtaposition, as at Maturatta. The Valley, extended by artificial Terraces up every Ravine, down which water can be made to pass, on its way to the River below, presents a vast expanse of green, reaching to the very crest of the surrounding hills; while, wherever Paddy Cultivation ceases, Coffee cultivation begins. In the immediate vicinity of the villages, there are gardens, in which Onions, and Potatoes, grow luxurianity: and I had the satisfaction of hearing the Planters bear uniform testimony to the conduct of their Kandian neighbours, who appear to be a peaceable, thriving, and industrious Race, where not contaminated by Low Country Singhalese—the outcasts, generally, of their native Districts,—or forced into brawls by Coolies belonging to the Estates. I was much struck, myself, by their manner, and appearance;—the wonderful ingenuity, with which they have turned the smallest, supply of water to account;—their ready appreciation of the advantages, which the District will derive from the opening out of the Country;—and with the justice, and simplicity, of their views, under the novel circumstances in which they are placed.

"For Maturatta, instead of being one of the most secluded spots in the Island, is rapidly becoming the centre of an important District. The transfer of the Court from Newera Ellia to the Fort, where I have authorised the erection of a Small Court house, and Bungalow,—the prospect of a Bandy Road to Kandy, which must be steadily kept in view,—the establishment of a Post Office, and a Police Station,—the Bazaar, which is growing up, on the site of the old fortifications;—the opening, consecutively, of twelve new Estates, with every appearance of adding largely to that number, so soon as the Surveyor General is enabled to bring fresh Land into the Market:—and the progress already made in tracing the Road into Ouvah, by the Elephant Plains, which will make this the shortest Route to Kandy for the Coffee from the Badulla, and Oode-Pusilawa, Estates,—all these are circumstances, that must materially influence the prospects of Maturatta, and ensure its rapid progress in cultivation, and wealth.

"No greater mistake can be committed, than to suppose that, in facilitating this progress, the Government is consulting private, not public, interests. Public prosperity is but the result of the aggregate prosperity of all the great interests, that compose Society. "The Planter does his part, by turning the jungle into cultivated land, and connecting his clearing with the Main Road of the District, to which it belongs. But that Main Road is a Public Road;—at least, it becomes so, from the moment that the District contributes its quota to the Commercial movement, from which so large a portion of the Revenue is derived. It may be difficult to define the precise limits of public and private, responsibility. Men, who want help from the Government must be ready to do their part in the work proposed. But the Government should also be liberal in its aid; for nothing can be clearer than the fact, that, in Districts like Maturatta, there are large Government Interests, as well as Native, and Planting, interests at stake.

"The Crown has still a considerable amount of Land to sell. That Land will not be bought unless

a fair supply of labour can be secured ;—and it is well ascertained that Coolies will not engage themselves upon Estates, where they are obliged to carry Coffee, from any distance to Kandy, and to bring back the Rice for their own consumption.

"To sell therefore, we must improve. Roads and Bridges, are as necessary as Surveys, to the profitable, disposal of Land. And my conviction is, that for many years to come, in the present position of Ceylon, the most certain mode of increasing the Revenue of the Island, is a judicious liberality in the use of the means, which it has. The Customs are the gauge of what is practicable, and what is right. So long as their increase corresponds with increasing expenditure, the Government is paid, indirectly for every shilling it lays out.

"With these views, I have urged upon the Surveyor General the immediate extension of his operations in the Maturatta District, with a view of dividing the Land in the vicinity of the Fort, into small building lots, and of bringing into the market, as soon as possible, some of the more valuable portion of the Coffee Land above it. I have also made a small grant of £80. for improving the communications with Newera Ellia, from whence the Estates draw many of their supplies ; and, so soon as the Road from the Maha Oya is brought down to the Bridge over the Bilhool Oya, I shall propose to substitute an Iron Lattice Bridge, should those now on their way out to the Colony, be found to answer, for the small, and inconvenient structure, which though repaired by the Provincial Committee, was originally due to the liberality of the Father of the present Koralle of Wellegiriya, aided by a Kandian Priest."

Conscientious yet considerate, grand old Sir Harry never passed through a district without indicating the exact truth regarding its condition, possibilities and requirements. Mark how delicately he could touch upon the weak spots, as in the case of Rakwana where, he said, the coffee was "somewhat poor and thin." Here he had nothing but well-chosen words of praise, encouragement and practical sympathy. Well might the gentlemen, who in the present day inspect estates and quarterly repeat what must often be prosy platitudes, take a leaf out of Sir Harry's book, when their reports would at least, be more lively and prove more interesting reading.

The needs of the district are still the same and even more urgent than they were forty years ago ; but with the development of tea, the claims of such a locality cannot much longer be overlooked. A light railway from Peradeniya through Nilambe, Deltota to Hewaheta seems feasible enough, *malgre* the Tramways Commission ; and we trust the matter will not be allowed to sleep till this otherwise favoured district gets due facilities for sending its rich returns to market.

DR. ROBERT HOGG, who died on the 14th ult. at the age of seventy-nine, was one of the foremost men in horticultural circles. Originally a partner in a large nursery, now forming the site upon which the Imperial Institute, the South Kensington Museum, and other buildings are placed, Hogg for many years conducted, either alone or in connexion with the late Mr. G. W. Johnson, a journal known as the *Cottage Gardener*, which gradually evolved into the *Journal of Horticulture*. But probably his greatest claim to the appreciation of his colleagues and of those who are to come after him was the production of the "Fruit Manual," a standard work of original research in the shape of a descriptive enumeration of fruits cultivated in this country, which has gone through several editions, and is as well known to fruit growers on the continent as it is here.—*London Athenæum.*

CROPS IN JAMAICA.

The annual report on Jamaica, which the Colonial Office has just published, shows that the colony is, upon the whole, prosperous. The revenue during the financial year was £646,103 and the expenditure £626,934. There was an increase of £22,078 in revenue, mainly from increased imports. The public debt is £1,666,177, chiefly incurred in public works, especially railways, canals, and roads. It is stated that there is a growing desire to improve the quality as well as increase the quantity of the crops. The rate of increase in other products is greater that the decrease on sugar, and for this fruit is mainly accountable. The decline in the cultivation of sugar cane is persistent ; the increase in coffee, ginger, cocoa, and tobacco has been great ; and in bananas very much greater. Sugar last year was only 11 per cent of the total exports. The value of the imports last year was £2,288,946, against £2,191,745 the previous year, while the exports amounted to £1,873,105. About half the imports go from the United Kingdom, the United States coming closely behind. The trade with the latter is increasing rapidly, and American goods of many kinds are said to be supplanting English ones, partly due to greater enterprise of American manufacturers, but mainly to the greater facilities for trade with the United States. The population of the island is estimated at 690,667—London *Times.*

MACHINE-MADE TEA.

GOOD NEWS FROM AMERICA FOR CEYLON.

During a recent trip to Cincinnati, O., covering ten days, the writer was surprised to find that wherever tea was served it proved to be Ceylon or India tea, a fact indicative of the phenomenal progress made in their introduction. When consideration is given to the fact that China monopolized the tea markets of the United States for over 100 years and that Japan contributed over 40 for cent of the supply since 1875, then we realize the tremendous prejudice which the advocates of machine-made tea have to overcome, and are the better prepared to estimate and appreciate the rapid hold gained for machine-made tea in this country within two years. In 1894 the imports were 4,700,000 pounds, in 1896, 9,500,000 pounds—a gain of over 100 per cent.

No one can successfully deny that the bulk of the importations of China and Japan tea have been of medium and low grade, with a large volume of trash. The law just passed regulating importations of tea will check the imports of poor and trashy tea, and bring the attention of consumers more and more to a consideration of the merits of Ceylon and India tea.

It has been difficult to impress upon consumers that a much less quantity of machine-made tea is required to make a satisfactory infusion than of China and Japan sorts, but this lesson they are acquiring rapidly, and thus discovering the economical advantages arising from the use of Ceylon and India growths, besides becoming wedded to their flavour. None are more enthusiatic advocates of British-grown tea than many who a few years ago discredited them in many ways.

A few days ago an importer, in commenting upon the remarkable increase in direct shipments of tea from Ceylon to America—viz., 64,966 pounds from January 1st to 26th of this year, against 10,415 pounds for the same time in 1895—said: "That is nothing to what it will be a few years hence, when they will have this market."

We do not, however, entertain the idea that the teas of China and Japan will be entirely displaced, but we do believe that the enterprise, push, pluck and perseverance of the Ceylon and India tea-growers in seeking a market here will result in such an increase in the use of tea as a beverage that machine-made teas will dispute for first place

with China. This is however, a very much more conservative view than many American dealers entertain.—*American Grocer*, March 10.

SUNNYGAMA (CEYLON) TEA ESTATES CO., LD.

The following is from the report to be submitted to the shareholders at the fourth ordinary general meeting, to be held at the company's offices, No. 138, Leadenhall Street, E.C., on Monday next:—

The directors beg to submit the annual statement of accounts for the year ending December 31st last.

CROP.—This again shows a substantial increase over that of last year, while the price obtained also shows some improvement. Advices from the estates are of a very satisfactory nature, showing that every care is being paid to the culture of the existing gardens, while the extensions of the past three years are reported as most successful. The cost of these latter is being defrayed from the capital raised by the late issue of £5,000 in Preference shares, but as this amount is being rapidly expended it is proposed to issue a further portion of the £20,000 of these shares authorised to be issued, to develop the large area of freehold land still cultivated belonging to the company; of this due notice will be given to the shareholders. The higher rate for exchange ruling during the year has, it may be mentioned, added about ¼d per lb. of tea to the cost of production, and to this extent contracted the profits. Mr. R. B. Magor, one of your directors, retires by rotation, and, being eligible, offers himself for re-election.—*H. and C. Mail*, March, 26.

THE COMING RUBBER BOOM.

Nothing seems more certain than that the great rubber industry will be partially paralysed through exhaustion of present sources of supplies, and that the fortunate owners of rubber plantations, be they few or many, will reap huge fortunes. It is this certainty, proved by the rubber statistics, which is at the bottom of tho great afforts now being made to obtain plantations in Mexico and elsewhere, but chiefly in the former country. Mexico is the home of the *Castilloa elastica*, acknowledged to be the best of the rubber-yielding trees from the planter's point of view. *Hevea brasiliensis* gives the most valuable rubber—Para—now worth 3*s*. 7*d*. per lb., while that from the *Castilloa* only realises 2*s*. 4*d*. But the difference in value is greatly owing to the better methods of preparation which obtain in Brazil. When the *Castilloa* milk has been taken in hand by a skilful British chemist, as it shortly will be, we shall, without doubt, see a marked improvement, and the price will be levelled up to within measurable distance of that of "fine" Para. The prospects of the rubber planter in Mexico, even at present values, are more rosy than those of any other arboricultural industry. And this applies, more or less, to every country in which the *Castilloa elastica* will thrive. A profit of 300 per cent. in the eighth year is what the experts are promising, and the figures are based in one instance on a selling price of 1*s*. per pound for the rubber, and in another on 2*s*., the first being less than half the market value of *Castilloa* rubber in London to-day, and the second 4*d*. below it. That rubber can be grown cheaper than it can be purchased from the native collectors is an absolute fact, and it is obvious that the quality must be far superior to any wild product, except, perhaps, Para, the method of preparing which does not seem capable of improvement. For joint-stock enterprise the cultivation of rubber trees in Mexico offers a fine field, as there is no substitute for rubber worthy of the name, and small probability of there ever being one. At present adulteration is rife, greatly to the detriment of the trade. Wo hear of powdered flint and cement being used to eke out the supply, and the demand for old worn-out rubber goods is very great. The only apparent remedy far this disastrous state of things is cultivation on an enormous scale.—*The Colonies and India* Mar. 20.

VARIOUS PLANTING NOTES.

COOLY DISTRICTS OF NORTHERN MADRAS.—It is rumoured—and we are very pleased to think correctly—that His Excellency the Governor has decided to send Mr. Ingramcotton on a visit to Bellary, Cudappah and the other cooly districts in North-Eastern Madras where distress if not famine is said to prevail, in order to enquire and report on the feasibleness of drawing a supply of cooly labourers therefrom for Ceylon estates.

PLUCKING, PRUNING, AND PREPARATION OF TEA.—The Indian *Tea Planters Gazette* devotes the editorial in its issue of 10th April to this subject beginning as follows:—"The Editor of the *Ceylon Observer* has, we consider, conferred an undoubted benefit on the tea industry, not only in Ceylon, but throughout India generally, in issuing the sets of questions contained in the two circulars which he distributed to the planters throughout the island. The answers which have been received to the second set of questions are so instructive to all interested in tea, that we decided to reproduce them in our columns, and we feel sure our tea-planter friends will appreciate the results of the efforts of our contemporary. The object of the enquiries was to elicit information, which would be helpful to planters in their endeavours, while securing from their estates the highest possible yield without injury to the bush, to maintain a high level of excellence for the tea they produce—in other words, to obtain the best possible prices." Our letters in answer to the circular are by no means all published, though pressure through an usual number of meetings and the holidays have recently delayed publication.

THE DESTRUCTION OF CEDARS.—The news that comes to us from various parts of the destruction of fine cedars like those at Goodwood should more than ever teach the need of yearly planting in parks. At one certain time some tree lover on a large estate plants a noble lot of cedars, but, as those who follow fail to keep up the stock, a great storm may somo day destroy what all are so proud of. This could not happen to anything like the same extent if people went on planting young trees, not necessarily many kinds, but some like the cedar of Lebanon, that happen to do well in our climate, and have all the beauty and dignity that trees can have. The many catalogues issued help towards the neglect of the really precious trees by "bringing out" novelties from all parts of the world—absolutely unproved trees; whilst the planting of such grand trees as the cedar of Lebanon and the ilex of Europe are often forgotten. A mistake in cedar planting is the fashion of planting isolated trees with great branches growing out on all sides. Just think of the enormous surfaco exposed to strong wind that these great trees and branches offer! In their own country, where cedars are naturally massed together, although the gales are severe, the trees are not destroyed by wind in anything like the same degree. The cedar of Lebanon is certainly very beautiful by itself in this "specimen" way, but we think it at least equally beautiful massed in groups or even in woods. We have seen excellent results from planting cedars in mixed woods, where they make straighter boles. In their own countries, in addition to being massed and grouped together, tho soil is very often stony and rocky, the growth is slower, and the trees take a firmer hold, whereas in our rich river valleys, where the Lebanon cedar is often planted in an isolated way, the growth is softer, and the resistance to wind less. We feel sure that a more artistic and natural way of planting would lessen the accidents to which this noble tree is exposed.—*The Field*.

THE HARBOUR OF COLOMBO, CEYLON; AND A PROPOSED RAILWAY TO CONNECT SOUTHERN INDIA WITH COLOMBO.

(Special Report for the "Ceylon Observer.")

On Tuesday, March 23, in the hall of the London Chamber of Commerce, Botolph House, Eastcheap, London, Mr. Donald Ferguson read a paper by Mr. JOHN FERGUSON on "THE HARBOUR OF COLOMBO, CEYLON, AND A PROPOSED RAILWAY TO CONNECT SOUTHERN INDIA WITH COLOMBO."

SIR ALBERT K. ROLLITT, M.P.*

had to leave the chair soon after the opening of the meeting to attend to his Parliamentary duties, and his place in the chair was taken by Mr. Thomas Christy.† There were also present:—Sir Charles Lawson, Mr. Henry Kimber, M.P., Mr. S. B. Boulton (vice-president of the Chamber of Commerce), Aldn. Haddon, J.P., Capt. G. Green, Dr. George Colborne, Messrs. W. R. White, W. Martin Smith, R. Paulusz, F.C.S., H. W. Cave, W. Martin Leake, S. J. Wilson, J. Hamilton, John Haddon, J. Davis Allen, J. B. Meredith, J. Fernando, F. J. Waring, C.M.G., J. Macarthur, J. L. Shand, A. B. Struthers, George W. Johnson (Colonial Office), Kenric B. Murray (Secretary of the Chamber of Commerce), F. H. M. Corbet, John Kyle, J. Macintosh Smith, Zimmer, F. E. Mackwood, Peck, the Secretary of the Ceylon Tea and Timber Syndicate, Ld., McEwan, Donald Andrew, E. Hewell, H. Flindt, Robert White, L. Clerc, Montrose, C. Ralston-White, G. L. Stenning, H. L. Forbes, G. W. Christison, H. T. Gardiner, A. M. Ferguson, T. E. B. Skinner (late Postmaster-General, Ceylon), R. H. Ferguson, Bagshaw, C. Thynne, Y. B. Howard, George D. Jennings, Alfred Beeston, Alex. Ross, A. L. Hutchison, J. C. Roberts, &c., &c.

* Rollit, Sir Albert Kaye, (*Islington*, South div.) s. o Mr. John Rollit, of Hull, solicitor, by Eliza, d. o Mr. Joseph Kaye, of Huddersfield, architect. B. a Hull, 1842; educated at King's College, and the University of London, of which he is a Fellow and Member of the Senate (B.A. 1st class honour 1863, LL.B 1st class honours Principles of Legislation, &c., 1864 LL.D. first and University gold medallist 1866): D.C.L. Durham 1891; m. 187?, Eleanor Anne, 2nd d. of the late William Bailey, J.P., of Winestead Hall, Holderness, steamship owner at Hull, London, &c. (she died 1885). A solicitor in Mark Lane and at Hull, a prizeman of the Incorporated Law Society 1863. Is also a ship-owner at Hull, Newcastle, and London. Was sheriff of Hull 1875-6, and mayor 1883-4-5; Hon. Freeman of Hull; Elder Brother Trinity House, Hull; President of the Associated Chambers of Commerce, U.K.; chairman of the London Chamber of Commerce; president Hull Chamber of Commerce; president Municipal Corporation Association; F.R.A.S.; F.Z.S., member of the Committee of the British Association; Lieut.-Col. Engineer Militia (Humber div. Sub-marine Miners). Is J. P. co. of London, and D. L. London and Yorks. He was knighted in 1885. A "progressive and independent Conservative," and "through unionist," in favour of wide local government for Ireland.—30, *Lowndes-square, S.W.*; *Dunster House, Mark-lane E.C.; Carlton, Constitutional, Savage, Ranelagh, and City Carlton Clubs; Cogan House, Hull; Cottingham, E. Yorkshire.*—"DOD."

† Mr. Christy is a fellow of the Linnæan Society, and very specially interested in the development of new tropical products and lands.

The Paper (read by Mr. D. FERGUSON) was to the following effect:—

"THE HARBOUR OF COLOMBO, CEYLON; AND A PROPOSED RAILWAY TO CONNECT SOUTHERN INDIA WITH COLOMBO."*

Paper by J. FERGUSON, *Editor of the "Ceylon Observer" and "Tropical Agriculturist."*

INTRODUCTION.

THE island of Ceylon is usually described as the first and most important of British Crown Colonies. It has an area of close on 25,000 square miles, and a population of over 3 millions. But two-thirds of the population are found in the South-west portion of the island; while extensive districts in the North-Central and Northern divisions have scarcely more than a few units to the square mile, although in ancient historical times these were the most populous and prosperous parts of the island. The ruins of the ancient capitals Anuradhapura and Polonnaruwa, show to what a pitch of prosperity the Sinhalese Buddhist kingdom before and after the Christian era had attained. This position the Sinhalese lost through the constant incursions of Tamils—alien in race and religion—from Southern India until—the bunds of their irrigation tanks cut, their towns devastated and destroyed,—the Sinhalese were forced back into the South and West of the island, and what were cultivated rice fields have, for many hundreds of years, been covered with heavy jungle.

The great Planting industry of Ceylon in tea, cacao, coffee, rubber, &c., is chiefly confined to the 4,000 square miles of mountain zone in the Central, South and adjacent lowcountry districts to the South and West. The natives cultivate cinnamon on the West coast, and coconut and other palms all round the coast, save for intervals on the North-West and North-East.

Apart from the ancient ruined cities, and the better-known central capital of Kandy, the island has long had three well-known towns or ports. The grand natural harbour of Trincomalee on the North-East coast may be counted among the half-dozen finest harbours in the world, and its possession for the Naval Headquarters in the East Indies, was a chief reason why, on the General Peace in 1815, England decided to give Holland the much richer and larger island of Java in exchange for Ceylon, which was then regarded, with Trincomalee, as very much the key to India. Then Point-de-Galle sprang rapidly into notice on the South of the island, as the Mail-steamer Port; while the Political and Commercial Capital was found in Colombo surrounded by country highly cultivated and a dense population, while Trincomalee had neither population nor cultivators to speak of in its neighbourhood.

Ceylon has always been closely associated with India, one of its ancient names describing it as "a pearl-drop on the brow of India"; while its people, the Sinhalese, originally came from the North of India; and the Tamils now settled in the North and East of the island are the same people as occupy all the Southern divisions of the Madras Presidency.

I will only say further, by way of introduction, that the construction of a first-class railway from Colombo to Kandy and its extension afterwards through the chief planting districts as well as another line South to Galle and Matara, consolidated the overshadowing importance to the island of Colombo as almost its sole export and import shipping port.

ADAM'S REEF AND ISLANDS.

As regards its geographical connection with India, I would point out that while the populous peninsula of Jaffna on the extreme North of the island

* This paper is printed from the writer's first draft, and may, in some respects, differ a little from the finished copy read before, and to be published by, the London Chamber of Commerce.—ED. *T.A.*

is separated from India by the generally shallow Palk's Strait or Bay,—on the North west, the connection by means of detached islands and coral reefs is a much closer one with Indian territory. It begins at Mannar, an island separated by a narrow channel from the mainland—and South of which, I may mention. the famous Pearl Oyster Fisheries of Ceylon have taken place from time immemorial, and as we all hope, will one day soon be resumed. The island of Mannar is 17½ miles long, and after it we come on the series of coral reefs, sandbanks and tiny islands (numbering some 20 in all) known as "Adam's Bridge"—from the superstition (following a much older Hindu one in favour of a king of the monkeys) that here our first parents crossed when sent from the Garden of Eden to reside in Ceylon, Adam's Peak mountain being deemed further evidence—an old Muhammadan tradition which led to Arabi and his fellow Egyptian exiles being at first very much gratified when they learned that Ceylon was to be their place of banishment.

This Adam's Bridge extends a distance of 22 miles between the Ceylon island of Mannar and the island of Rameswaram, which appertains to India, and of this distance, half may be said to be spanned by tiny islands, while half is under water.

The island of Rameswaram itself is like that of Mannar about 17 miles long, and is chiefly notable for a famous Hindu temple, one of the four or five most noted shrines in all India for pilgrimages; although the pilgrims having to cross water and other discomforts in travelling at present, no doubt prevents Rameswaram being visited by more than a tithe of the devotees who crowd to more accessible shrines.

North of Rameswaram there is only the narrow Pamban Channel, with a navigable width of 80 to 130 feet, separating the island from the mainland of India. Altogether the distance between the two mainlands is about 57 miles, 35 of these being occupied by the two islands and adjacent channels, and 22 by Adam's Reef or Bridge.

THE CENTRAL POSITION OF CEYLON, AND OF THE PORT OF COLOMBO.

I would now refer briefly to the very central position of Ceylon as to Southern Asia and Australasia and as between Africa, the Eastern Archipelago and the Far East. The port of Colombo, it will be observed from the map of Asia, is perhaps the most central and convenient in the Indian Ocean and the opening of the Suez Canal at once gave it a special importance in reference to Madras, Calcutta, Rangoon, the Straits and China as well as to Australian Ports.

I should like to mention one or two striking facts as to its immunity from storms and the favoured position of the island altogether (almost inclining one to think favourably of its claim to be allied with Eden!). They are as follows (quoted from Ferguson's "Ceylon in 1893"):—

"The situation of Ceylon in the Eastern World is peculiarly favoured in certain respects. The atmospheric disturbances which periodically agitate the Bay of Bengal, and carry, in hurricanes and cyclones, destruction to the shipping in the exposed Madras roadstead and the devoted Hooghly, seldom or never approach the north-eastern shores of this island. If Java and the rest of the Eastern Archipelago boast of a far richer soil than is to be found in Ceylon, it is owing to the volcanic agency which makes itself known at frequent intervals by eruptions and earthquakes, the utmost verge of whose waves just touches the eastern coast of the island at Batticaloa and Trincomalee in scarcely perceptible undulations. On the west, again, Ceylon is equally beyond the region of the hurricanes which, extending from the Mozambique Channel, visit so often and so disastrously the coasts of Madagascar, Mauritius, and Zanzibar. The wind and rain-storms which usher in periodically the south-west and north-east monsoons, sometimes inflict slight damage on the coffee and rice crops, but there is no comparison between the risks attaching to cultivation in Ceylon and those experienced by planters in Java and Mauritius."

The wind and rain storms which usher in the annual South-west and North-east monsoons have scarcely ever attained a dangerous force; and although they make it difficult sometimes to reach the harbours of Galle and Trincomalee, no such difficulty is experienced in reference to Colombo. It is no wonder, therefore, that after prolonged enquiry, surveys and reports as to the respective merits of Colombo and Galle, Sir Hercules Robinson (now Lord Rosmead) when Governor of Ceylon, on the final recommendation by the late Sir John Coode, decided that public money should be spent in giving Colombo (rather than Galle,) adequate protection and harbour accommodation for Mail as well as Commercial steamers and eventually as was hoped for the Navy as well.

The convenience of Colombo to the Imperial Government has been often proved for military purposes: troops thence have been readily transported to China and Labuan; during the Mutiny, Governor Sir Henry Ward sent nearly every British soldier in the island to aid Lord Canning; in 1863, the troop-ship "Himalaya" took the 50th Regiment on board at Colombo to suppress the Maori War in New Zealand; in 1879, the 57th Regiment was despatched at short notice to South Africa, followed by the 102nd transferred in the same way; in 1881 and later on the regiment stationed in Ceylon was utilized for Egypt. For wellnigh 50 years there has been no disturbance in the island calling for military attention: the Sinhalese are the most peacable and loyal of British subjects.

Next let me mention that the port of Colombo is 900 miles from Bombay, 600 from Madras, 1,400 from Calcutta, 1,200 from Rangoon, 1,600 from Singapore, 2,500 from Mauritius, 4,000 from Natal, 2,200 from Aden and 3,000 from Freemantle, Western Australia. On the Malabar Coast of India, there is not a single harbour or port worthy of the name between Colombo and Bombay and the same is almost true on the Coromandel Coast up to the Hooghly, Madras being scarcely an exception.

COLOMBO HARBOUR WORKS.

On the 8th December 1875, the foundation stone of the first and principal Breakwater for the protection of Colombo Harbour was auspiciously laid by H. R. H. the Prince of Wales—then on his visit to India and Ceylon—Sir W. H. Gregory being Governor of the island. Sir John Coode planned and directed the work; Mr. John Kyle, M.I.C.E., (now of the new Dover Harbour Works) being Executive Engineer. In October 1876 when the Breakwater had been extended 350 ft. Colombo was visited by the late Duke of Buckingham, then Governor of Madras, and His Grace took a special interest in Sir John Coode's thoroughly solid, satisfactory work as contrasted with the cheap and unsubstantial harbour works constructed at Madras which had shortly before succumbed in a cyclonic storm, falling to pieces like a pack of cards. Looking at the spacious first-class harbour designed for Colombo, its central and commanding position and the absence of any good harbour in the Madras Presidency, the Duke of Buckingham declared that as the natural compliment for its Harbour Works, Colombo ought to be connected with Southern India by a railway across Adam's Bridge. Governor Gregory favoured the scheme; but with the responsibility of the Harbour Works, and Railway Extensions in the Centre and South of the island, he could do nothing with the suggestion, nor could his successors for some 17 years. By the end of 1884, the South-west Breakwater, 4,150 feet long with a lighthouse at its terminus, was completed at a total cost—including foreshore reclamation and other allied work—of £705,000. This at once afforded full protection to Colombo Harbour for nine months out of twelve in the year, at any rate so far as allowing 24 buoys for first-class ocean-going steamers to be fixed under lee of the breakwater. Sir John Coode felt all along that

his work would not be complete without another protecting arm for the harbour; and after his lamented death the design for this addition being entrusted to his firm (Messrs. Coode, Son & Matthews), Mr. Matthews visited Colombo, and as the result of his inquiry and inspection, the designs and estimates for two additional protecting arms—a Northern and North-Western breakwater—were sanctioned and these and allied works (as shown in the plan on the wall) are now under construction, Mr. J. H. Bostock being the Resident Engineer. These arms are to be 1,000 feet and 2,670 feet in length respectively, are to cost £527,000 and to be finished by 1901 A.D.

The foreshore all round the harbour is to be reclaimed and suitable coal depôts are to be established for the mail as well as commercial and naval vessels, leaving plenty of room (much required at present) for the import and export trade of the port, for passengers' jetties and other requirements of a first-class harbour. When these arms are completed, the Colombo Harbour will have two openings each 800 feet wide; and the area enclosed will be 660 acres, affording accommodation for quite a fleet of vessels of all sizes and grades, it being noted that the tendency of these days is for steamers to remain in port as short a time unloading, coaling and loading, as possible,—quick despatch being the test of a port's convenience and good management.

The total cost of these Harbour Works £1,250,000 has been guaranteed by the Colony, the steadily increasing income from port dues, pilotage, rent, etc., fully justfying the outlay. There are now few busier ports, than that of Colombo, and not being properly a terminal port, it is fittingly called the Clapham junction of mail steamers and passengers for the East and far South. It is the great meeting-place for the steamers of the Peninsular and Oriental Company, of the Orient S.N. Company, of the Messageries Maritimes, of the Norddeutscher Lloyds—all running to Australia and China as well as India; also of the British India S.N. Company with its complete Indian Coasting as well as Queensland Service; of Bibby's Liverpool, Marseilles and Rangoon line; of the Clan, City, Ducal, Ocean, and a great variety besides of British as well as foreign Steamer Companies. Every national flag is from time to time, displayed in the harbour, as many as 15 to 20 large ocean-going steamers occasionally arriving in one day. The aggregate inwards and outwards tonnage for Colombo now approximates to 6 million tons per annum.

One great advantage of Colombo harbour is the ease and safety of approach at nearly all seasons during night or day. The Colombo lighthouse stands 120 feet above sea level and the light is visible 18 miles off at sea. Harbour lights will mark the ends of the Breakwater arms and openings nearly 13 miles off. The average rise and fall of the tide is only about 18 inches.

GRAVING DOCK.

It was felt all along that without a Graving Dock, Colombo Harbour Works could never be considered complete, and after full consideration and negotiations between the Admiralty, the Colonial Office, the Treasury and the Government of Ceylon, it has just been decided (a few weeks ago) that a first-class Dock of the largest size be constructed at Colombo on a design by Messrs. Coode, Son and Matthews, 600 feet long by 62 to 85 ft. broad, 23 feet deep equal to taking in the largest ironclad afloat, at a cost of £318,000—half of which is to be provided by the Colony and half by the Imperial Treasury. The work is to be done by 1901 A.D. Colombo will then possess both the largest Artificial Harbour and Graving Dock in the world.

IMPERIAL IMPORTANCE OF COLOMBO.

After this, it is needless to dwell on the Imperial importance of this central port with its safe harbour and stores of coal—nearly 350,000 tons imported annually, at the most commanding point in the Indian Ocean. Modern batteries and guns for its defence have been already provided and it is anticipated, that, when the Dock is constructed, the East Indian Naval Headquarters will be transferred from Trincomalee to Colombo. Thirty thousand passengers to or from all parts of the Eastern and Austral world pass through Colombo each year, and as to the local trade, the Ceylon Exports and Imports are now valued at £10 million sterling per annum, the former including 100 to 120 million lb. of tea, mainly shipped to London for consumption in the United Kingdom. Colombo has a population of 130,000 altogether spread over 11 square miles; it is one of the most beautiful and healthy of tropical towns, a good water supply being brought from a hilly district, 30 miles distant, into the City; while Mr. Mansergh, C.E., is engaged in designing improved Drainage and other Sanitary requirements. As to Railways, Ceylon has now 300 miles of first-class 5½-feet broad gauge line, the Northern terminus being Kurunegala, from whence a section of 71 miles is projected to the ancient capital, Anuradhapura; while between it and Jaffna a feeder line on 2½-feet gauge is recommended.

CONNECTION BETWEEN SOUTHERN INDIA AND CEYLON.

Turning now to Southern India, I may point out that there is a very close connection in trade and community of interests between the island and the mainland. Indeed, the great planting enterprise of Ceylon depends to a very large extent for its very existence on the free immigration of Tamil coolies from Southern India. These come over to the number of 120,000 every year, about 80,000 to 90,000 returning, and as many as from 300,000 to 400,000 of them altogether are employed in the island. This is besides a large number of traders, artificers, domestic servants, etc., coming to Colombo. These Indian coolies are all constantly coming and going—returning home to see relatives and invest their little savings. They often arrive a weak sickly people and with the good food and fine climate on the plantations often become a sturdy, sleek, happy class. Their favourite route used to be crossing at Pamban and by boats to Mannar and then walking down the long road to Matale; but of late years a daily steamer service between Tuticorin—by no means a convenient port—and Colombo, has tempted the larger number by that route, although they heartily dislike the sea.

Next a great quantity of rice is imported from Southern India—Ceylon not growing half enough to feed its town and immigrant population. There is also a large supply of other food products, live-stock, poultry, &c., from Southern India to Ceylon; and a certain quantity of raw material such as cotton. From Ceylon there is a large export to India, of areka (betel) nuts, copperah, coconut oil, &c.

COLOMBO AND AN INDO-CEYLON RAILWAY.

Travancore, a flourishing planting division in Southern India, may be considered an offshoot from Ceylon, its first planters having been trained in the island, and the natural market for its tea, &c., is Colombo—where there is now regularly established weekly public sales of tea. To all Anglo-Indians in the Madras Presidency—whether public officers, planters, missionaries or others—Colombo must become the favourite port; because there, they can get a steamer direct to almost any part of the world, which is not the case at Calcutta or even Bombay, while few steamers now call at Madras. With railway communication established between the Madras Presidency and Colombo, there cannot be a question that the latter would become the port for all the passenger traffic beyond seas; while such a line would carry all the coolies migrating to and fro, whose numbers to Ceylon especially, could not fail to increase very largely. At present, Ceylon planters would be glad of 50,000 to 100,000 more immigrants than they have and the requirements of the island are yearly increasing. Passengers in the shape of pilgrims for Rameswaram Temple, would certainly prove a growing item in the traffic of an Indo-Ceylon line. Colombo has already been made the Mail-port to a large extent for Madras and Rangoon and with a Railway all the foreign mails and passengers and a certain amount of goods for Southern India would pass through Colombo—a great advantage at such a time as this when

the Bombay route is almost barred on account of the Plague.

Then from a Military and Imperial point of view, an Indo-Ceylon Junction Railway could not fail to be of much importance to British troops kept in the comparatively cool healthy barracks at Bangalore, or higher up on the Nilgiris, who could, if required, be carried by rail for shipment at Colombo to any part of the African, Austral, Asiatic, European or American world. The British Infantry Regiment now kept in detachments at different stations (mostly very hot) in Ceylon, might well be dispensed with or kept ready at Bangalore more especially in view of a full local Infantry Volunteer Corps, Volunteer Artillery and Mounted Foot Companies to back the Royal Artillery in charge of the Batteries. For local disturbance of any kind, there is absolutely no need of the British regiment.

Having thus shown the intimate trade and cooly relations between—and the great encouragement to connect Ceylon and Southern India by railway, I come to the question of the practical work required and the probable cost of the same.

THE INDO-CEYLON RAILWAY :—GAUGES.

The Standard Railway Gauge of India adopted by Lord Dalhousie is 5½ feet and Ceylon followed suit for its own Railways. But there are 700 miles of Railway on the metre-gauge in Southern India and there is only an extension of 100 miles from the town of Madura (60,000 people) through a populous district to Pamban required to complete the South Indian system. From Pamban there would then be unbroken communication by metre-gauge lines to the town of Madras serving all the Presidency territory between these points and across the Southern districts. In Ceylon there is no metre-gauge ; but if the direct route from Manaar along the healthy open West Coast to Colombo* were adopted, there would be no interference with any existing railway in the island and the metre-gauge (served it might be from workshops in Southern-India) would find its own terminus in Colombo and its grand harbour. Such a line after the 100 miles to Pamban, would be 58 miles across the islands and reef to the mainland of Ceylon and about 140 from Manaar *via* Puttalam, Chilaw and Negombo into Colombo.* One great advantage on the Ceylon side of this route is that a profitable local traffic—in passengers especially —would be commanded all the way from Colombo to Chilaw. At present a canal serves a good deal for goods but it is crossed at intervals by rivers and; cost the Government a good deal every year to keeps open ; while there are complaints about the long delay in the transport of produce, fruit, &c., by canal. Puttalam is the chief seat of the manufacture of salt, used in the island—a Government monopoly. The objections to this route is the number of rivers that require to be crossed, especially between Manaar and Puttalam, so that a diversion inland has been proposed here.* At any rate some such route is the only one available for the metre-gauge and as affording the most direct and healthiest railway route between Southern India and Colombo.

There is another plan, however, for connecting India and Ceylon on the 5½-feet gauge, which has been constructed in Ceylon up to Kurunegala, while the Government favour an extension (through a country bare of people and traffic) to Anuradhapura.† There would then only remain about 60 miles to reach Manaar (via Madawachchi perhaps)—or 131 miles to make from Kurunegala on the 5½ feet line against 148 for the metre by the West Coast. One drawback to the inland route, apart from its circuitous nature (making Colombo 119 in place of 148 miles from Manaar) and the unhealthiness (fever and malarial country) of a long expanse of jungle, is found in the fact that the section of the Colombo and Kandy line required to be used from Polgahawela to Colombo (46 miles) is already wellnigh fully occupied with traffic ; while an Indian through train service should be direct, free from interruptions, well-equipped and comfortable.

The still greater objection to a broad gauge connection is the long distance on which a broad gauge would have to be laid in India—some 200 miles—before the broad-gauge system was reached at Erode. It has been said that adopting the broad-gauge would connect Ceylon with all India ; but this argument is of little value ; because it is to serve Southern India up to Madras that Colombo Harbour is adapted ; and there can be no inconvenience if uninterrupted railway travelling can be commanded on the metre-gauge between the cities of Colombo and Madras.

Of course, there is the third course of breaking gauge either on the Ceylon or Indian side, the broad being now in Ceylon and the metre in Southern India. Imperial authorities should, in that case, decide on the gauge for the actual crossing between Manaar and Pamban.

SURVEYS, REPORTS AND ESTIMATES

I have now to refer to the Surveys and Reports which have been made by Engineers with reference to an Indo-Ceylon Railway. On behalf of the Ceylon Government, Mr. F. J. Waring C.M.G., Chief Resident Engineer for Railway Extensions, in April 1894, made a "Report upon an inspection of the route for the proposed Indo-Ceylon Railway from Pamban to Taladi near Manaar, and of the alternative routes by which a railway, if made, might be connected with the Ceylon Railway system." Mr. Waring's Report is a full and valuable one. Beginning at the Southernmost point of India, the results he arrived at may be summarized as follows :—

Pamban Channel crossing (including swing bridge 100 ft. wide) to cost ..	R450,000
Rameswaram island (50,000 devotees often at temples) 17½ miles at R55,000 ..	950,000
Adam's Bridge, 22 miles, 19 being islands, bridging between, 18,100 lineal yards of bridging, total cost ..	25,500,000
Manaar island, 17½ miles at R55,000 ..	960,000
Manaar Channel	520,000
Total for crossing from India to Ceylon about 58 miles	R28,380,000

or at 1s 3d the rupee = £1,773,750. All on the 5½ feet gauge.

Before going further I may compare this estimate with that of Mr. E. C. SHADBOLT, Engineer-in-Chief, Madura-Pamban and other Railway Surveys, who examined and reported about the same time in April 1895 proceeding on the principle that the through line from Madura to Colombo would be on the metre-gauge ; but allowing for a double line in the "crossing" from India to Ceylon. Mr. Shadbolt also allowed for a swing bridge 100 feet wide at Pamban, but he made heavy allowance for one mile of line on reef to reach the bridge. As regards this "crossing" we sum up as follows :—

Pambun reef 1 mile	R1,050,000
,, swing bridge 100 feet	R 300,000
Rameswaram island 20 miles	R1,000,000
Adam's Bridge 21 miles—building a solid line on the breakwater principle 12 feet high, 30 feet wide—in water, average depth 4 ft;—12 miles at R1,500,000; on low islands 6 miles at R1,100,000; on high islands 3 miles at R100,000..	R24,900,000
Manaar island 17 miles at R50,000 ..	R 850,000
Total for crossing bridge to Ceylon [£1,756,000.] .. .. or	R28,100,000

A sum singularly near to Mr. Waring's—considering that the two Engineers adopted differing modes of crossing the reef and estimated for different gauges,

* It has been proposed as an improvement that the line should run from Colombo to Puttalam or Dutch Bay, thence to Anuradhapura and *then* to Manaar. Several leading Civil Servants with experience of the districts favour this route and there is no special objection to it.—ED. T.A.

† Moreover a very arid, poor country in which planters see little prospect of successful cultivation,—ED, T.A.

Mr. Waring examined the country form Manaar or rather Taladi *via* Madawachchi and Anuradhapura to Kurunegala, a total of 132 miles which he would probably estimate to cost on light broad-gauge about R7,260,000—making a total of R35,640,000 for the Ceylon portion and the crossing on the broad-gauge; but to this would have to be added if the broad-gauge were adopted on the Indian side 100 miles of new line to Madura and alterations of lines for 38 miles to Dindigul and (in Mr. Shadbolt's opinion*) next 100 miles new broad line to Palghaut—in all an outlay of about R17,000,000—making a total outlay of R52,640,000 (£3,290,000) for 487 miles and making the railway distance between the cities of Madras and Colombo by broad gauge 821 miles.

On the other hand, taking the metre-gauge as running from Madras to Madura, Mr. Shadbolt estimates for 100 miles to Pamban at R4,177,460; the "crossing" as above 58 miles at R28,100,000 and then for 145 miles from Mannar to Colombo, Mr. Shadbolt allowed R100,000 a mile—he not having been over the country, while Mr. Waring (following his assistant Mr. Oliver who surveyed part of the route) put it under R85,000 for a broad gauge. For a metre-gauge therefore, Mr. Shadbolt should find R65,000 per mile sufficient and we get for 149 miles (more accurate than 145) a total of R9,685,000—giving a grand total for 307 miles of R41,962,460 (£2,926,655) and the distance between the cities of Madras and Colombo by metre-gauge 650 miles.

Mr. Waring suggests a shorter route by a new broad gauge line being made between Dindigul and Kudimudi and a mixed rail utilised on each side. The distance from Madras to Colombo would then be about 714 miles. But we do not know how the Madras authorities would favour this proposal; whereas a line to Palghaut has actually been projected.

SUMMARY OF ARGUMENTS IN RE ROUTE, &c.

I would now briefly sum up what may be said about the route for an Indo-Colombo line:—

(1). That the Coast line from Manaar (possibly via Anuradhapura-Puttalam) to Colombo is by far the most direct and *healthiest* for through travellers.

(2). That it can be on metre-gauge without interfering with the established the Ceylon Railway system.

(3). That it can be constructed by a private Syndicate without adding to the financial responsibility of the Colony.

(4). That it will serve a very important coconut-growing country—part of it extremely populous—and and also open up very desirable new land for palms, between Chilaw and Puttalam (and inland therefrom) which the natives are eager to buy.

(5). It will give ready access to the Pearl Fishery grounds (and also to Dutch Bay).

(6). Bring the coolies by a safe route and drop them at a depôt North of the Kelani whence they can easily move to the upcountry line or afterwards be carried to Kalutara, etc.

(7). Such a line worked by a private Company under certain regulations as to charges, would give the Ceylon and Home Governments as well as the public a much-needed check (by way of comparison) on some of the existing Ceylon Government lines, as to outlay in upkeep, repairs, working expenses, etc.

(8). This Coast line would also enable us in Ceylon to compare the merits and demerits of the two gauges with reference to the opening of the North and East of the island.

(9). It should be a great advantage to have the same Syndicate making and working the line on both sides of the Adam's Bridge Viaduct.

(10). It is impossible for any impartial Anglo-Indian or Anglo-Ceylon resident to approve of the roundabout interior route from Manaar to Kurunegala, to Polgahawela and thence Colombo, with its unhealthy drawbacks for many months, as compared with the more direct sea-coast line for an Indo-Ceylon railway. How would it do to take *Anglo-Indian invalids* through the most feverish part of Ceylon?

(11). It is certain that a great part of the direct coast line will have eventually to be made even for *local traffic*. It will pay better than the line to Galle; and we all know how expensive it is to keep up a Canal crossed by rivers often in flood—and how slow the traffic is by boats. Steamers and coaches cannot overtake the passenger traffic between Colombo and Negombo and Chilaw, and steamers can run only to Kelaniya—3 to 4 miles from the heart of Colombo.

(12). There is, of course, the immense importance of a direct line from South India to the heart of Colombo with its grand, fully protected Harbour and Dock-to-be.

(13). And, also, the scope for settling some of the surplus population of South India in the region eastward from Manaar, Puttalam and Chilaw.

(14). As regards extending from Kurunegala Northwards, nearly every authority, who has thought of this, is agreed that a tramway (speed, 8 or 10 miles an hour) on the existing excellent North road would amply suffice to serve traffic and develop the country, as far as Jaffna.

TRAFFIC ESTIMATES.

I next come to Estimates of Traffic for the proposed line. These have never been the subject of a proper enquiry. The only published approximation is by Mr. Shadbolt, the Indian Engineer referred to. He first calculated that in order to secure a net return of 4 per cent. on his total estimated outlay from Madura to Colombo of R48,700,000, the gross receipts must amount to R3,900,000 per annum. But in the first place, I have shown that with corrections on the Ceylon side which Mr. Shadbolt never inspected, his total cost should be reduced to R41,962,460; and in the 2nd place, Mr. Shadbolt's estimate of the emigrants and immigrants—based on figures of some years back—is far below the mark of the present day; while, indeed, the number coming to Ceylon from South India is now likely every year to increase—the Ceylon planters at this moment wanting 50,000 to 100,000 more labourers. As regards goods traffic it is very difficult to form even a guess; but I should certainly expect Travancore and South India tea generally to find its way to the Colombo market by rail, as also a certain proportion of rice and other produce. Mr. Shadbolt took no account (as he points out) in his estimate of first-class passenger traffic, or of local traffic, both on the Indian and Ceylon side. Now for the line from Madura to Pamban by itself, there is an estimate of traffic showing a net return of 13·55 per cent. on the capital outlay. No doubt this takes account of pilgrims to Rameswaram and emigrants to Ceylon. On the Ceylon side, I am clear that a line from Colombo to Puttalam ought to yield 5 per cent. on its cost simply from local traffic. That being the case and looking to the many ways in which the convenience and utility of the junction line would be realized—in military movements for instance—I think it would be safe to say that a net minimum return of 3 per

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* Mr. Shadbolt's opinion is as follows:—

(1). The line must be on the metre gauge. The whole of Southern India is occupied by this gauge.

(2). The line must run direct to Colombo and not be hampered and depreciated by trying to work it in with existing lines.

(3). With regard to Adam's Bridge the shoals have a tendency to increase and become more stable and a form of construction should be adopted which would encourage this.—See "Report" for views on the water currents.

These are three points in which I fancy I (Mr. Shadbolt) differ essentially from Mr. Waring.

The following are matters of speculation rather than observation:—

(4). I believe the natural position of Colombo ensures it a future of immense importance. Its situation will make it for Asia what London is to Europe.

(5). The political value of the railway would be enormous with regard to the Far East in allowing the military resources of India to be concentrated at such a commanding point.

(6). The fear of Ceylon being administratively merged in India is absolutely puerile and rests on nothing. The idea of Madras annexing anything is almost unthinkable.

cent. might be anticipated on the total cost of a metre-gauge line from Madura to Colombo.

ANTICIPATED BENEFITS.

I would now attempt in a few words to summarize the benefits already indicated which would accrue from an Indo-Ceylon junction Railway to India, to Ceylon and to the Imperial Government. First, as to INDIA, we have a first-class Harbour made available for Southern India, which is without a single port of its own worthy of the name. Steamer communication with all parts of the world—even to the Pacific and East as well as South African Coasts—is maintained from Colombo. There is also a favourable market for South Indian produce, especially tea, coffee and rice. Next there is the beneficial outlet or its surplus population. Some of the Collectorates of the Madras Presidency are immensely indebted to Ceylon as it is: in the Madras famine of 1877, Ceylon saved as many lives of the famine-stricken as were probably rescued by all the other official and private relief applied. I think it is Sir Charles Bernard who has said that in Southern India there are several millions of people who, if they can get the equivalent of 2s 6d per family per week, are well-off, but who, inasmuch as they often cannot make more than 1s 6d, are on the verge of scarcity and sometimes of famine. Now Ceylon not only wants an increased number of free immigrants; but it offers in its North-West and Central parts a great extent of land for gradual but permanent settlement to the overcrowded Tamils of Southern India,—a matter of immense importance to the Indian Government, since the distress and famine now prevailing in the North, may, any season, be experienced in the South as it was ten years ago.

The advantages to CEYLON are largely connected with a free and ample labour supply for its plantations, roads and other public works and for the taking up of waste land. An Indo-Ceylon Railway, in its saving of time, health and money to the poor coolies (as compared with the wearisome road and ferry route, and the troublesome steamer-crossing) would make no mean addition to the number of days' labour even without increased numbers. But these would be sure to come: a Planting Commissioner (Mr. E. J Young) who went over the Madras Presidency some years ago and saw the chief authorities, made sure that unbroken railway communication was the one solution of a continuous labour difficulty—never more pressing than in the present year. Then, of course, unoccupied districts in Ceylon would benefit by development; while the port and market of Colombo could not fail to be directly benefitted when they became the chief outlet for the Madras Presidency.

Then as regards IMPERIAL interests, it might be enough to remind you how these are bound up with the advancement of British Dependencies. London secures all but an insignificant portion of the trade from Ceylon: the more that island is developed—and it has capabilities for supporting at least 8 to 10 in place of 3 millions of people—the more produce there will be to export, and the greater the demand for British goods—already very largely consumed by the native people of Ceylon. Anything, too, to relieve the pressure of population in India is a matter of Imperial importance. Mr. Chamberlain would find in an Indo-Ceylon railway a potent means of developing thousands of square miles of fine land now lying idle in the "public estate." But there are also the direct Imperial advantages from a Naval and Imperial point of view. To have a Naval basis in the Indian Ocean so convenient and secure as Colombo, facing the French in Madagascar, central for either the Malabar or Coromandel Coasts of India or for Burma and the Straits and commanding for Western Australia, would surely be an Imperial gain. Still more may be said in reference to military and strategic advantages; but on this I need merely quote Sir Charles Dilke when in a recent standard work he says:—"India under a better organization of Imperial Defence would become the Eastern centre of defence from which garrisons in half the world would be aided and upon which, rather than upon home arsenals, they would depend for their supplies. * * * The creation of an Eastern Woolwich is an Imperial need."

But any decision that India shall be the source of succour and supply for our Eastern Possessions raises at once the other question, at what point on her vast coast line are the succour and supply to be made available? With the map before him no one will challenge the proposition that, given railway connection between India and Ceylon,—so that men and war materiel may be passed into the island promptly and safely,—Colombo is the point where our vessels and stations in Southern and Eastern waters might best obtain repair and supply. Put it this way. Wherever the Eastern Woolwich, to borrow Sir Charles Dilke's apt phrase, may be placed, the Eastern Portsmouth should stand in the utmost south, an arm outstretched to succour. And the two should be made one by railway,—by the Indo-Ceylon Railway.

The other day at the Society of Arts, Sir Charles Dilke spoke of Ceylon as "an important strategic point" and that "the garrisons of many islands and coaling stations would have to be increased in time of war which would greatly add to the burden of the Navy at an inopportune moment." But this is just what railway communication with India would obviate, as troops could be poured into Colombo—a very important coaling station—whenever war threatened, without ever troubling the Navy.

I have tried to show that, financially and commercially, there is justification for undertaking an Indo-Ceylon junction railway; but it will now be seen to be something more than a sound business undertaking, it is a necessary factor in the defence of the Empire under the conditions imposed by the armed approximation of France from the south-westward and the extension of the Russo-French alliance eastward.

In a letter published a few months ago in a London paper, M. de Lanessan (late Governor-General of French Indo-China) writes:—The important works done at Colombo give her (*i.e.* England) not only a port of call perfectly safe at all periods of the year, but also *the command of the most central points of all* the Indian Ocean." M. de Lanessan, I hear, is an expert in matters of this sort, and his opinion on the strategic importance of our port ranks high among the arguments for the equipment of Colombo as a naval base on a scale commensurate with her geographical position; and for the construction (as a part of that experiment) of the Indo-Ceylon railway.

Finally we have had the expression of opinion of the present Governor of Ceylon—His Excellency Sir J. WEST RIDGEWAY K.C.B., K.C.S.I., who, in his Opening Speech to this Legislative Council on Oct. 26th, 1896, declared:—

"I believe that railway extension to the North will soon lead to railway communication with India, and railway communication with India will, I believe, remove any labour difficulty that may arise. I believe that railway communication with India would be good for trade, and that in time of war Indian trade would prefer the land route to Colombo to the risk and dangers of the sea passage across the Bay of Bengal."

It might not be easy to fit the work of a Syndicate or Company—especially if adopting the metre-gauge—into correspondence with the existing Ceylon Government lines. Permission to lay a third rail, and for running powers would be required. But I am led to believe that to a responsible body undertaking an independent metre-line all the way from Madura to Colombo, by the coast route, the Governor of Ceylon and his Councils would offer no objection especially if the proposal came on at an early date.

"Ways and means" always form an important part in the consideration of a great undertaking of this kind. It is a matter of recent history, I believe, that a Syndicate promoted by a Bombay mercantile house and leading men on the South India Railway made proposals for an Indo-Ceylon Railway to the India and Colonial Office authorities,

and from the former, got a certain time-concession, now expired. A Syndicate or Company formed in this City of London with an intelligent appreciation of the benefits accruing from its work, ought, I should think, to be readily met by the Indian, Colonial and Home authorities. A joint guarantee of 3 per cent, the responsibility being divided between the Indian, Ceylon and Imperial Treasuries, ought not to be grudged and ought surely to suffice.

It has been suggested that as an Indo-Ceylon Railway would probably enable the Imperial authorities to station at Bangalore the British Infantry regiment now divided between Colombo and Trincomalee, so some financial aid towards the guarantee for the line might be got through the saving in the Military Contribution. Ceylon at present pays into the Imperial Treasury by way of Military Contribution about R1,600,000 (says £100,000) per annum. Part of this at least might be saved under the conditions already indicated and utilised to promote so useful a work for the Imperial, Indian and Ceylon interests as an Indo-Ceylon Railway.

While Indian and Ceylon Railways, in spite of many troubles, are—says a recent writer in the Indian press—paying literally "hand over fist," it is anomalous that the English capitalist should continue to send his money for investment in South American and other such speculations. The fact probably is that in the City of London the promoter's, the broker's, and the gambling speculator's interests lie in far more tempestuous waters than in the calm harbours of Indian railway enterprise. Where out of India and Ceylon will be found many thousands of miles of railways worked under an unimpeachable system of audit, and costing in operating expenses only about half of their entire earnings? And yet capital is shy of coming forward. Anything that the Governments of India and Ceylon can do to make it clear to the sensible English investor that in Indian railways there is a fair field for legitimate enterprise, will be a gain all round as well to the English capitalist as to the Indian taxpayer.

I send with this MSS. a copy of the Report of Mr. Waring, M.I.C.E., C.M.G., and also of that of Mr. Shadbolt, the Indian Engineer, with their diagrams and plans, as referred to in my paper, to lay on the table for the use of members. I also forward a map of Ceylon with the Railway lines constructed, surveyed and projected, duly marked,

J. FERGUSON.

Colombo, Ceylon, February 25th, 1897.

DISCUSSION.

The CHAIRMAN:—I came here to learn, for it was quite sufficient for me to know that Mr. Ferguson of Colombo, had prepared the paper to be sure that there would be a great deal of information in it. (Hear, hear.) I think it will save a considerable amount of time if we do not follow the paper throughout. It is well-known to almost everybody in this room—because they are nearly all practical people, accustomed to trade with the East—that Colombo is a magnificent port. In the next place I think we can clear a good deal of ground if we do not follow the paper into the military question today. In the railway to unite Colombo with India, I think we shall find we have a sufficiently large field to cover this afternoon. Anyone looking at the map of Ceylon, and the map of Southern Asia, must see that Ceylon is the central point. Governments are not always in advance of the people, and the people themselves are not always ready to advance—especially people in new countries (and Ceylon is practically a new country). But Ceylon is ready for the new railway. If a railway could be made it is quite certain that it must pay. In America we see how much is being done to save a few hours, and sometimes even a few minutes, in travel and transit. By this railway it is hoped to save days, and thus to bring Australia and Java and South and Central India into closer connection. There are so many practical people in the room, thoroughly conversant with this subject that I am sure you will be glad to hear them instead of myself. I may say, however, that I have heard that matters are rather more advanced than some of us had thought.

Mr. H. KIMBER, M.P.,* said:—I have just returned from a journey to India, in the course of which I went over the ground with which the lecturer has dealt in his interesting paper. There is no doubt that a line such as he describes, connecting Ceylon with the mainland of India, and connecting it by a bridge, is rather a more serious undertaking than he contemplates. But undoubtedly it will eventually be an accomplished fact, and it will, I am sure, be for the benefit of commerce generally and of India and Ceylon in particular. (Hear, hear.) I have been a Director of the Southern Indian Railway for years, and this line would be a branch of our main line. The concession which Mr. Ferguson referred to, granted some three or four years ago, having expired, fresh negotiations are now before the Government. We have had meetings to confer on the subject and to get into practical shape a project for construction by feeder line Companies, with a view—*one* view—of getting the subscription of Indian and Ceylon and English capital. The propositions to the Government offered two alternatives—one to do it under a 3 per cent guarantee, and one to do it under a $3\frac{1}{2}$ per cent qualified guarantee. In the first case (the 3 per cent) the terms can be obtained at the India Office: they were published last week in a Parliamentary return. The 3 per cent guarantee would be one by the Government, with certain conditions attached which I need not go into now. The $3\frac{1}{2}$ per cent is a guarantee by the parent Company out of traffic, the details of which are in a statement which I have not got with me; and I prefer not to give them from memory. I think this brings the railway very near to accomplishment. I saw Sir West Ridgeway in passing through, and had some conversation with him as to the railways upon the Ceylon side. The heads of the Ceylon Government are bent upon railway construction, and there can be no doubt that there will be progress on the Ceylon side trending towards the Indian Coast. Sir West Ridgeway told me the question was one of gauge. I pressed upon him as to Mannar that he should make that with the metre gauge. As ours is metre-gauge, and the gauge extends up to Poona, it will be seen that if they want to run from Ceylon up to Bombay quickly it should be by one gauge, and that one the metre-gauge. The position on that side we must leave for the Ceylon Government. Prospects as regards traffic

* Kimber, Henry. (*Wandsworth.*) s. of Mr. Joseph Kimber, of Canonbury. B. in London July, 1834; m. 1860, Mary Adelaide, d. of the late General Charles Dixon, R.E., of Rectory Grove, Clapham. Was admitted a solicitor in 1858, having previously taken the first prize of the Incorporated Law Society, and a second-class certificate in law at University College, London. Is a director of the South Indian Railway Co., chairman of the Natal Land and Colonization Co., and director of several colonization and other Companies. Is also a member of the Royal Colonial Institute Has sat for Wandsworth since 1885. A "progressive Conservative."—79, *Lombard-st., E. C.; Lansdowne Lodge, West-hill, Wandsworth, S. W.; Carlton, City Carlton, St. Stephen's and Constitutional Clubs.*—"DOD."

on our (Indian) side are very good indeed. I don't suppose we have had a branch line which offers such good prospects in itself, even without the aid of a guarantee. (Hear, hear). I left my big ship at Colombo and took a small ship to Tuticorin to see the approaches to the Indian coast. The distance from coast to coast (on the railway route) is, I think, about equal to the breadth of the English Channel from Dover to Calais. That is, of course, a formidable distance to get across. I saw not only Sir West Ridgeway, but also Sir Arthur Havelock and the Viceroy in Calcutta, and they all seem to look upon the Indo-Ceylon junction as a thing for future consideration entirely, not for the present. It would involve the making of a railway 20-odd miles across the water, and though it is true that for a great portion of that distance there are rocks and ground seldom more than seven or eight feet under the surface of the water, yet, even so, anyone with the slightest knowledge of engineering would know that it must be a formidable work. Then there comes a portion of very deep water, and how that is to be spanned is for engineers to explain. But the present suggestion is by steamers. A good port can be obtained on each side by steamers of considerable size. It is suggested that the existence of this ridge under water would afford in one monsoon protection on the one side, and in the other half of the year, during the other monsoon, the passage would be on the other side, by which the ships would be equally protected. So it is considered that the passage by water would be a tolerably easy one—considerably easier than the one of 150 miles that I made. It is altogether an undertaking of a most interesting character, and I am glad Mr. Ferguson of Colombo has brought it before us at this time, when discussion is taking place with a view to bringing the matter into practical shape. (Applause.)

Mr. F. J. WARING, C.M.G., said :—I spent some considerable time at Adam's Bridge, during which I made a survey of it. Mr. Ferguson was hardly correct in saying theware s no "column".* I saw there was; it was all sand. As to the depth of water, I took very careful soundings and there is a maximum depth in one place of 34 feet. About half the distance is of sand and sand islands, and the other half water. About the route for the connecting railway between Adam's Bridge and the rest of Ceylon, I have advocated a line from Mannar to Madawachchi, where it would connect with the proposed Northern railway. Travelling from Mannar to Puttalam the country is quite uninhabited and any line passing through that country would there cross rivers at their deltas, where they are very low and subject to very serious floods, I think. † The rainfall for several months is practically nil. The line down the centre of the island, recommended by a Commission sitting in Colombo, would pass through country with a better rainfall—country which was at one time in a high state of cultivation, as is evidenced by the ruined tanks by which it is covered. I do not wish to be understood as indicating any doubt as to the practicability of constructing a line between Mannar and India. I believe it to be perfectly practicable. But there can be no doubt whatever that it would be very costly, and I fear that the colony of Ceylon would hardly undertake that at present, though I think—and I have spoken with many officials in Ceylon upon the subject, and I think the general impression among these officials is that the line will come—that a line between Ceylon and India will come in the future, though possibly the present time is hardly ripe for it. There is one little point on which I should like to touch. I have been a great deal maligned. I have, I fear, the character of being a determined advocate of the broad-gauge, irrespective of any conditions whatsoever. That, sir, is not the case. I am not an advocate for broad or any other gauge. The gauge of a line should be a geographical question. But there is one thing I am opposed to, and that is a break of gauge. When once the gauge of a railway has been introduced into a country, after mature deliberation and great study of the question, I think that should be adhered to. We have in England the experience of the Great Western Railway. When it was constructed Mr. Brunel made light of break of gauge. History has shown us how great its evils are. It is no use to say there will no difficulty in an independent line from Mannar down the coast. It would not be independent, I think. The majority of the passengers would be immigrant coolies, the bulk of whom go to the different estates upcountry. Taking them down from Puttalam to Colombo would be distinctly sending them out on their way. They would have to go back again to reach the upland estates. I think the cry for a branch-line from Puttalam to Kurunegala would come at once, in order to save the coolies' travelling distance. (Hear, hear.)

Mr. F. H. M. CORBET:—We are once more greatly indebted to Mr. Ferguson. (Hear, hear). The line may not be possible just at present, but it must come, and the sooner the better; and Mr. Ferguson has greatly helped to break the ground. (Hear, hear). If there has to be a break of gauge we have to make it where it will cause the least inconvenience. Probably Puttalam would be the easier point. Even if goods were wanted upcountry their transhipment from Colombo would not be a very serious matter. The increase of passenger traffic between Puttalam and Colombo may be reckoned upon as a certainty. There is a thriving population between the two, and it lends itself to great increase should facilities for transport be given. Experience in Ceylon, has shown that within an exceedingly short time a population has clustered around railway stations, and has provided the traffic which the line was intended to serve, and as a rule, that has far exceeded the estimates formed at the outset. Everything in Ceylon has been in favour of railway construction. (Hear, hear.)

Mr. H. W. CAVE:—I think the railway should not go from Puttalam to Manaar; but as far north as possible. It would be the means of opening up the North-Central Province, which was, two hundred years ago, the support of millions of people. The district is now uncultivated; and, having recently spent considerable time in that part of the island, I express the opinion that if the railway were brought directly through the Province it would be the means of not merely bringing coolies to Colombo but would open up the whole of this Province. (Hear, hear.) No doubt if the railway were made, British enterprise would be the means of bringing the Province under cultivation once more. (Hear, hear.)

* *Sic* in reporter's notes, but must be some blunder. —ED. *T.A.*

† This is obviated by passing from Mannar *via* Anuradhapura to Puttalam.—ED. *T. A.*

The CHAIRMAN, in moving a vote of thanks to the author and the reader of the paper, said :—Mr. John Ferguson has done wonderful work for Ceylon, and India as well. (Applause.) It is no light matter to get up all this information and these statistics and place them here in the City of London, and get together the practical men who are here today, and who thoroughly understand the evolution of this railway. It does seem an extraordinary thing: it is many years since I was in Ceylon—before there was a harbour there at all—and people were quite sure there could be no harbour made in Colombo with stones, because of the force of the sea. This has been got over, and here we have a small break in between two large masses of country, and with plenty of material—and we hear this afternoon that it is just a question of gauge! Surely, if the foundations can be got in—and we know in England wonderful foundations have been laid for breakwaters—if that can be done it won't matter if there are three lines of rails down, because if they can get one embankment down that can stand the gauges. As to whether they should end in India or Ceylon, that is quite a separate question hardly worthy of discussion. The great question is how we are to bridge over this small strait between the Continent and Ceylon, was to give Southern India the full advantage of the Harbour of Colombo. (Hear, hear.)

The vote of thanks was passed by acclamation, and Mr. DONALD FERGUSON briefly responded, the proceedings closing with the usual acknowledgment of the CHAIRMAN'S services.

We may add here extracts from some letters received by the writer of the Paper, by a recent mail :—

Sir Thomas Sutherland, Chairman of the P. & O. S. N. Company, in a kind note of apology for inability to be present, remarks :—

"I ought to have been at the meeting of the Chamber of Commerce today to hear your paper read; but it has been impossible, for I have had so many things to do. As you have an excellent Chairman in Sir Albert Rollit—a man of encyclopædic knowledge—my presence was the less necessary. Your idea lies undoubtedly in the future, it must come about."

Mr. Matthews (Harbour Works Consulting Engineer) is good enough to write us by the mail :—

"I had a most important engagement fixed for today with a gentleman from South Africa, who has come home to consult us, and so was unable to get away in order to attend the meeting of the Chamber of Commerce at which your paper was read. I gather, however, from a letter to hand from Mr. Kyle, that he was present. Mr. Kenrick Murray sent us some cards, and I am today writing him a letter of thanks, informing him that it was with great regret that I was unable to attend. Had I had a few days' longer notice, I might have made arrangements accordingly, but I was not aware until yesterday morning that your paper had been fixed to come off this afternoon. Had time permitted I might also have got up a cartoon plan for the lecture room. If you require a small scale plan of the Harbour Works to illustrate your paper—as no doubt it will be published—we shall be very pleased to supply the same if you will let us hear from you."

A Ceylon proprietary planter, present, writes :—

"The whole thing was, I think, a great success, and your paper highly approved of, as well it might, for it was a very able document, and must have taken a lot of work to compile. I have no doubt that the railway will follow in due course, but let us urge *quickly*, for there is no use waiting till we go back from want of labour on our tea estates, and so let the island lose its name to a certain extent. Moreover, with this plague and famine, labour ought to be got on a very cheap scale for the work on the line."

Another ex-Ceylon resident writes :—

"On Tuesday I was in London and heard your paper read by Mr. D. W. F. It was a capital gathering, representative both of the City and Ceylon. The room was quite full and all listened attentively. Very pleasing references were made to yourself personally and the work you have done and there was a general feeling which found expression in some words that fell from the Chairman that the reading of the paper before the London Chamber of Commerce meant a definite step in helping to the carrying out of the scheme. One heard with pleasure the speeches of the Chairman, Mr. Kimber, M.P., Mr. Waring, Mr. Corbet, and Mr. Cave, though one regretted that others in the room, well qualified to speak, did not make an utterance. Mr. D. W. F. read the paper well, and Mr. A. M. F. helped us in following his comments by pointing to the map. The paper was followed with evident interest by all present."

Mr. D. W. Ferguson writes :—

"I was glad there was a good attendance, but sorry more did not speak. You will see what Mr. Kimber said about the intention of the S. I. R. to extend the line to Pamban. He also said the money had been deposited for it. I went to Spottiswoode's to try and get the Parlimamentary paper he referred to, but the only one I could get (which I send) does not give anything about a new proposal. Mr. Corbet is anxious that your paper should be read before the Imperial Institute!"

One of the most sensible criticisms on the Lecture was that offered by a City merchant, who has never been in the East; but who writes to us by this mail :—

"I listened to your paper on the 23rd inst. with much pleasure. It appears to me that you have made out a fine case for Colombo as the great Entrepot of the East. But if I might make the observation, there are two points which might be more fully dwelt upon, namely :—(1) The importance already of Colombo by reason of its own trade; (2) The trade between India and Australia which greatly needs such a facility as Colombo (with the proposed railway) would provide."

Mr. H. W. Cave writing to a friend, says :—

"I greatly appreciated Mr. Ferguson's able paper. He dealt with the railway question in the clearest and most forcible manner, so that it was no trouble to grasp the points urged from considerations so various. I ventured on a very few remarks in favour of the Anuradhapura route. The seacoast route would benefit India most, but the inland route would do much more for Ceylon, both for the native and European population."

[Mr. Cave has not been up the Chilaw road to see its industry and population and the forest reserves towards Puttalam: a divergence thence to Anuradhapura would, however, meet his views. —ED. *T.A.*]

The accomplished London Correspondent of the *Western Daily News* wrote of the lecture as follows :—

"The last lecture delivered at the London Chamber of Commerce for the season was prepared by Mr John Ferguson, the proprietor of the *Ceylon Observer*, and was read by his cousin, Mr. Donald Ferguson. He impressed upon the audience the importance attached to a railway which would connect India with the "pearl island." With conciseness Mr. Ferguson had traced the social advantages it would give to residents in Madras, besides accelerating their mails. The Empire would benefit its construction, for Colombo was the best and most accessible harbour to the South of India, which served as a connecting link with England, South Africa, Australia, and the Chinese ports. It would also be of material importance to the island itself, for at present the tea planters found a difficulty in securing enough coolie labour. On the other hand, the Tamils in the South

of India were either starving or else had to tramp along a dusty road through the centre of the island. Having explained the necessity of a railway track, the lecturer traced two alternative courses the first along the western shore, bounding a fertile tract of land but hampered by the deltas of rivers; the second, a longer one, through the centre of the island. Mr. Cave, however, whose book on the ruined cities of Ceylon is commanding so good a sale, spoke on behalf of the second line on the ground that it would pass across a district which two thousand years ago had been one of the most fertile in the colony, and which he held would come under cultivation were it more easy of approch to the native."

THE INDO-CEYLON RAILWAY.

From the London Correspondent of a Colombo contemporary, we quote as follows:—

London, March 26.

We had a Field-day at the London Chamber of Commerce on Tuesday last on the subject of the proposed Indo-Ceylon Railway. The authorities of that institution evidently did not anticipate a large audience to hear Mr. Donald Ferguson read Mr. John Ferguson's paper: for they shut off half the Council Chamber by the moveable partition, and the result was that the scant space was inconveniently crowded. There was a goodly gathering of Ceylon men present, amongst them being Mr. T. E. B. Skinner, Mr. H. W. Cave, Mr. F. J. Waring, Mr. J. L. Shand, Mr. W. M. Leake, Mr. F. H. M. Corbet, Mr, A. L. Hutchinson, Mr. J. Hamilton, Mr. A. Ross, Mr. J. C. Roberts, Messrs. A. M. and D, Ferguson, &c., Sir Albert Rollitt occupied the chair at the opening of the meeting, but having engagements at the House of Commons he quickly made way for Mr. T. Christy, who had to admit that he came to the meeting simply as a learner.

MR. FERGUSON'S PAPER.

The paper ably set forth the advantages, both commercial and political, that the construction of the Railway would offer to all concerned, and as it will no doubt be published in extenso in Ceylon I need not deal futher with it. The interest of the meeting centered in the speech of Mr. Henry Kimber, M.P., who, as a Director of the Great Southern India Railway, lately went over the ground, interviewing during his travels both Sir West Ridgeway and Sir Arthur Havelock. Speaking with full knowledge of his subject he announced that the scheme had now fallen into stronger hands and that its execution was nearer than most of us anticipated. He was further understood to say that his Company was prepared to construct the Indian portion of the new line as a branch of their system. Mr. Waring expressed an opinion, founded on personal observation, that there was no great engineering obstacle to bridging the straits, but the process would, he thought be a costly one. He also touched lightly on the vexed question of gauge, and playfully disclaimed the role of a thorough going opponent of narrow gauge lines: it was more the break of gauge to which he objected. But as was subsequently pointed out by Mr. Corbet, the Ceylon gauge being 5 feet, and the Southern India only one metre, if the two are to be made one line, there must be break of gauge somewhere for the coolies and for up-country traffic. Through goods from India sent for shipment for Colombo might indeed escape any break, if the metre gauge was continued from Manaar along the Coast to Colombo. Mr. H. W. Cave with his well-known predilections for the land of buried cities, laid stress on the importance of linking up the Anuradhapura district with its fertile acres ready to support a teeming population now starving in Southern India.

From no quarter was there even a whisper of a doubt in regard to the eventual construction of the Railway or of its vast utility when constructed. And Mr. John Ferguson may be congratulated on having once more lent an effective helping hand towards the fulfilment of another great scheme tending to the further development of Ceylon.

VARIOUS PLANTING NOTES.

JAPAN.—As a result of brisk sales of tea during last year, probably in consequence of the unexpected small amount of production, there is now, says the *Japan Times* of March 27th, very little leaf left in the Yokohama market, and this is almost unfit for exportation. A remarkable appreciation of prices may therefore be expected when the new tea is ready, in the coming month.

PACKING OF TEA AT GARDENS is attracting the attention of the Indian Tea Association as its General Committee has received a communication, from the Committee of the Calcutta Tea Traders' Association, to the effect that a number of claims have been sent in to that Association during the past season for the particular kind of damage to tea known as "cheesiness," apparently resulting from the use of unseasoned wood for the boxes.

JAPANESE ENTERPRISE.—Mr. Shibusawa and a few other prominent capitalists of Tokiyo have a project on foot to establish a joint-stock emigration company, with a capital of 1,000,000 *yen*. The waste lands, stretching over 10,000 *cho*, in the districts of Kato and Kasai in Hokkaido, are to be put under cultivation by sending emigrants from the interior. The application made to the Government for renting the land has already been granted, so it now remains to have the company organized as soon as it is recognized by the authorities. Beans and wheat will be at first principally raised, but it is intended to ultimately plant other crops.

MR. KELWAY BAMBER having retired from the service of the Indian Government in order to join his father's analytical business in London, invites orders for analyses of soils, manures, &c. &c. and adds:—

My experiences in Assam tea districts and more recently in Kumaon will enable me to draw reliable. conclusions from analysis and submit reports and recommendations, which would be of *practical* utility to planters. Besides work for individual gardens I shall be glad to try and elucidate any interesting questions affecting the tea trade generally, such as the chemical and other changes which occur in tea during the voyage home, when exposed to the high temperature and close atmosphere of the ship's hold.

INDIA-RUBBER—Says *The Globe* of April 3—The prospectus is issued of the India-Rubber (Mexico) (Limited), with a capital of £406,000 in 400,000 ordinary and 6,000 deferred shares of £1 each. Subscriptions are now invited for 300,000 ordinary shares, and £200,000 7 per cent. first mortgage debentures. The company has been formed to acquire and develop an india-rubber plantation known as "La Esmeralda," in the district of Juquila, Oaxaca, Mexico, and also the india-rubber and chicle gum estates and plantation of "Llano de Juarez" in the district of Pochutla, Oaxaca. These two properties cover together 440 square miles, and are freehold; and it is estimated that there are upwards of 350,000 india-rubber trees available for tapping. The list opens on Monday.

Correspondence.

To the Editor.

AGRICULTURE IN ZANZIBAR.

Friends' Industrial Mission,
Pemba, Zanzibar, Feb. 24.

DEAR SIR,—I am in receipt of your *Tropical Agriculturist*, and offer my best thanks. I will endeavour from time to time to let you know what is going on here and what I am able to do in the way of agriculture. At present I have no land and do not expect to have for some months. Meanwhile I shall use my eyes to the best of my ability. Agriculture here is in a condition next door to hopeless—not the fault of soil or climate, but of the so-called agriculturists who are the slave owners. We await the "Anti-Slavery Crisis" and its result.—Yours truly,

THEODORE BURTT.

[The abolition of slavery, announced the other day, will delight Mr. Burtt.—ED. *T.A.*]

JAVA AND JAPAN TEAS.

London, March 19.

DEAR SIR,—It appears I was wrong in thinking that the Exchange on Java bills was based on the market price of silver. I was misled by the information I got out of Whitaker, when looking for the weight and value of the various silver coins. I find that the Exchange for demand bills on Batavia is 11·90 florins for the pound sterling, or nearly par—the sovereign being worth both in Holland and Java 12·10 florins.

It is very fortunate for Ceylon that this is so, and it fully accounts for the slow progress Java has made in producing tea, for at a par exchange, it would not pay at present prices for the ordinary run of tea.

Of course, I knew where the Japan tea went to—but it is Ceylon that is the intruder and competitor on the Japan in the American market.—Yours truly, C. S.

CEYLON TEAS IN NEW ZEALAND.

CARELESS PACKING—QUARTZ MIXED WITH TEA—DISCREDITING OUR TEAS—SHAME ON THE CULPRITS !

Dunedin, March 22.

DEAR SIR,—We enclose herewith a sample of Ceylon produce which we bought for tea. The writer has had 25 years' experience in the tea trade in Mincing Lane, London, and in the Colonies, and has never come across this kind of leaf. Will you kindly inform us what it is ? The consumption of Ceylon tea in New Zealand is very much greater than Indian tea and it is a great pity that such careless packing has taken place, and if continued, it will, no doubt, be detrimental to the future prospects of Ceylon teas.

Besides the quartz we forward, there were small lumps of dried earth and pieces of matting in the package. We could give you the name of the estate if required. We are large importers of Ceylon teas of all grades and shall instruct our Agents in Colombo to fight shy of this estate.—We are, Dear Sir, yours faithfully,

pro. ARTHUR BRISCOE & CO.,
J. H. BROOMHALL.

[We certainly think the name in such cases should be communicated to the Planters' Association and Chamber of Commerce ; and if anything like wilful carelessness were proved, general publicity as a punishment should follow. It is a very serious matter to discredit our teas in countries where we aim at driving out inferior Chinese teas. The enclosure sent us contains quite an appreciable quantity of Ceylon quartz !—ED. *T.A.*]

ENEMIES OF CACAO.

Greenwood, March 25.

DEAR SIR,—With reference to the letter of the Hon. T. N. Christie, *re* Cacao Disease, I wish to point out that in your morning issue of 26th November 1894, you published a letter from me with the heading "*Enemies of the Cacao Tree*" in which I mention :

TO THE BARK AND WOOD.

"'Tomici perforans,' a small beetle one-10th of an inch long, inserts its eggs in lower part of stem when the bark weeps and decays, getting a claret colour in well-defined patches. The grub tunnels the trunk, the beetle the branches. Few trees survive their attack.

"I daresay that it would pay cacao planters to offer a good premium for the best way to prevent the destruction made by the little beetle 'Tomici perforans' alone ; for it is yearly the cause of the destruction of a large number of trees."

I now wish to add that I still consider that only a prophylactic remedy can be successful and that the destruction of the infested trees do little good as "Tomicus" is to be found in other dead as well as live wood in large quantities.

I have two species of mature cacao trees, which, although having been planted as supplies amongst the old Criollos, (of which few are remaining), have never been touched by Tomicus nor by the black grub borer, and are flourishing in the open.

It is the reason for which I have not abandoned all hope for this cultivation in Ceylon ; for they will probably prove to be towards "Tomicus" what the American vine stock has proved to be towards "Phylloxera." It might be for the same cause that the cultivation of the Criollo kind has been formerly abandoned in Trinidad and the West Indies—anyhow, for its great liability to disease.

In your issue of Feb. 15, you mention in an article "Visit of a Java estate proprietor" that Mr. Van Sohn says : "The cacao cultivation generally is not at all promising in Java any more than in Ceylon. *Its worst enemy in Java is a* BORING BEETLE."

It would be very interesting to know if it is the same "Tomici."—Yours truly,

A. VAN DER POORTEN.

TEA AND OTHER CULTURE IN MAURITIUS : MR. E. H. EDWARDS AND MR. CORSON TO THE FRONT.

Curepipe, Mauritius, April 2.

DEAR SIR,—I send you a cutting from "The Planters and Commercial Gazette" which may be of interest. Far be it from me to decry the island where I spent nearly twenty of the happiest years of my life, and where, after years of roaming, I would willingly end my days, but there is no doubt that the advantages for Tea Culture in Mauritius are very great. Land is in most instances cheaper, and the soil is undoubtedly better than in Ceylon, while, owing to the rapidly declining sugar industry, labor is becoming abundant.

Up to the present time the Experimental Farm is the only place where tea has been *cultivated*; it has been planted in many places and grows well, but, as you know, a tea plant to pay requires something more than to be simply stuck into the ground.

Many of your readers will remember the Mr. Corson, spoken of in the cutting: he is most enthusiastic over tea culture in Mauritius and I think he has every reason to be so.—Yours faithfully, E. H. EDWARDS.

TEA CULTURE IN MAURITIUS

At the time that the Government of Mauritius decided to start experimental farms at Curepipe and elsewhere to test the suitability of soil and climate for the cultivation of products other than that of sugar, their action received the unqualified approval of all intelligent men interested in the agricultural success of the country.

It, however, now appears that beyond the essay made in the culture of tea little has been done. This is to be regretted, for beyond all question, there are many economic plants that could be grown to great advantage in Mauritius. It is true that at the Royal Gardens, Pamplemousses, there are specimens of many tropical and sub-tropical plants, but for some occult reasons, nothing has been, or is being done to encourage extended cultivation.

Shortly after the commencement of the Tea Experiment, the Government in a commendable liberal spirit, sanctioned the engagement of a competent tea-grower and preparer in the person of Mr. J. A. Corson. This engagement extended over a period of five years with an understanding, beyond the shadow of a doubt on Mr. Corson's part, that at the expiry of the time he should have the option of renewing his engagement for a similar term; but owing to a lamentable want of foresight in his own interests, Mr. Corson neglected to have the precise terms committed "to stamped paper." The first five years expired in December last, when he was told his services were to be dispensed with. A short time previous to this date the Government called for tenders for the lease of the farm, but although several offers were made, none came up to the requirements of of Government, and matters remain in *statu quo* for another year.

The action of the Government in entirely ignoring Mr. Corson's alleged right to the option of a renewal of service may be wrong, looked at from a moral point of view; but we think the time has come when the cultivation of the farm should pass into other hands than those of Government, and thus obviate the necessity of the latter, by the sale of its teas, coming into competition with private enterprize.

The object of the farm, so far as tea is concerned has been attained. Mr. Corson has established beyond contention that tea can be grown in Mauritius as well as, if not better, than in the island of Ceylon and the provinces of India. His books show that the fields in full bearing yield 600 lb. per acre, and this, too, on poor soil—while the value of the prepared leaf is equally satisfactory. Mr. W. J Lloyd, a tea-tester and valuer, of the firm, Messrs. Barry & Co., Calcutta, when passing through Mauritius, a short time since, tested the Farm's teas with the following result:

		s.	d. per lb.
Broken Pekoe	15 per cent value	1	3 ,,
Pekoe	55 ,, ,,		10 ,,
Common	30 ,, ,,		6 ,,

or an average of 9·55d. per lb. The average for Ceylon teas for the last year was, we believe, 8d. per lb.

With such satisfactory results both as to yield and value, the cost of production only has to be considered. It has been said that the expenditure at the Experimental Farm has been very heavy considering the returns. This is so, but it must be borne in mind that Mr. Corson has been receiving the same amount of salary for looking after 20 acres as he would, had there been 200; buildings have had to be erected and machinery purchased, the cost of which it is scarcely fair to debit to two or three crops. Labor is nearly, if not quite, as cheap in Mauritius as it is in Ceylon, and the cost of transport from almost every part of the island is much cheaper.

Any further assistance on the part of Government in the shape of culture which would necessitate its teas coming into competition with private growers is unneeded and to be deprecated; so, without wishing to appear ungracious, we think it should retire from the field.

Our readers may think we make a very hazardous statement in saying that in ten years time the output of tea in Mauritius will exceed that of Ceylon Everything points to the culture of tea as the salvation of Mauritius as it has been of the sister island. But planters must go cautiously to work and above all things, not rush badly prepared teas into foreign markets.

A knowledge of the cultivation and preparation of tea is not acquired in a day and when acquired, has to be carefully applied. Mr. Chalmers, of the well-known firm, Messrs. Chalmers, Guthrie & Co., in a small pamphlet which he has written on the planting, cultivation and manufacture of teas, says: —"It is often said that tea is made in the field, and this is true, in so far, that good carefully plucked leaf is the essential basis of good tea. Manufacture is, however, responsible for much, and many thousands of pounds sterling are lost annually to the owners of tea property through neglect in this department."

For the future success of the tea industry in Mauritius it is imperative that there should be some experienced person on the spot who may be consulted on the culture and preparation of the leaf not so much for the local market as for that of England, the Continent, and America. Some locally made teas which sell freely here, were valued by Mr. Lloyd at from 4d to 5d per lb. Were these to be sent to England, a bad impression would be created as to the character of tea the island could produce, and of the capability of the planter to prepare it.

Many persons who recognise the advantages to be obtained from tea culture, hesitate to embark in it for various reasons. The principal ones are, their ignorance of its culture and curing, and the expense of the necessary building and machinery.

The culture can with care be mastered by following the instructions of an experienced man: the preparation and machinery &c., run hand-in-hand. A central factory would relieve both large and small planters of all apprehension on the latter score. There is already the nucleus of one at the Experimental Farm, which Mr. Corson is prepared to enlarge to meet the requirements of planters within a radius of 6 miles of Curepipe provided he can make arrangements with the Government to have a personal interest in the farm beyond merely that of Superintendent. It will be a thousand pities if the industry be allowed to flag through the Government and Mr. Corson not being able to come to some mutually satisfactory accord; to lose Mr. Corson's services at the present time is to throw away the money that has already been put into the Farm.

TEA AND INSECTS.

Dartry, Gampola, April 9.

DEAR SIR,—I send in a separate tin box some poochies that I found amongst my tea. They are most extraordinary looking things. Can you give me any information about them?—Yours faithfully, J. A. ROBERTS.

[Mr. Stauiforth Green is good enough to report as follows on the insects sent to us:—"Belong to the family Fulgora. The species emit a white waxy secretion in the immature state, sometimes taking a cottony form. Westwood mentions in his modern classification of insects, that "this production is collected by the Chinese and employed in the manufacture of the fine white wax so much esteemed in the East Indies."

They suck the pieces of stems and leaves, and in large numbers must do serious damage. The Frog Hopper, Frog Spit, or Cuckoo Spit, so well-known in England, is a member of the family."—ED *T. A.*]

THE CACAO DISEASE.

DEAR SIR,—Mr. Vander Poorten's communication regarding the cacao weevil *Tomicus* and the remarks thereon of Mr. Martin, of Yattewatte, are of undoubted value to cacao planters, as presenting to them the separate experiences of two different planters. And if you can collect the views of several Ceylon planters on this important subject, such information cannot fail to bear upon the future successful cultivation of cacao in our island.

When at the drafting of our Committee's Annual Report the consideration of this cacao enemy cropped up, it was referred to a Sub-Committee composed of cacao planters; and it was then thought that the subject was worthy of fuller investigation and discussion than the time at our disposal then permitted us, for the report had to be presented to the meeting almost immediately. But the time is now opportune, I think, for the exchange at leisure of our different views; and the publication of the results of individual observation with regard to cacao and its latest enemy.

It has been suggested that it would be important to make a careful study of the insect. No doubt this is a necessary step. But I consider that there is even a more important study than the life history of the weevil; and that is the life history of the cacao plant itself. For men of experience are too apt to keep to their own views, and the practice of their own methods till an enemy suddenly appears and disturbs their self-confidence and repose. Inquiry then follows with the result that things taken for granted previously become open to legitimate discussion. It may be taken for granted in this connexion that the weevil, which has become a new terror to certain plantations, is by no means a stranger. But the further acquaintance and familiarity with the insect through a knowledge of its life history is little likely to benefit the cacao planter, unless the doomed plant is studied with as much care and more than even the enemy which attacks it.

My own view of it, if it is of any value to my planting brethren, is that *the insect is not the cause of death to the plant, but one of the consequences of it.* And I maintain that without the opinion of a scientist upon the plant itself, in the first instance, no man is warranted in arriving at the conclusion that the weevil is the cause of its death. I should expect the planter, who ascribes the death of the plant to the weevil to be able to exclude all other cases before he lays the charge at the door of the insect *Tomicus.*

If we proceed a step further in the investigation we may probably be told by scientists who have studied the habits of the insect that Tommy belongs to a class of insects which delight in decayed or decaying timber. In which case the question at issue will be whether Tommy has of a sudden changed his natural instinct in the matter of his diet from decaying bark and wood to fresh, green, sappy plants, or whether the plant have from age, exposure to too much sunlight, poverty of soil, over-manuring, injury at the roots or their branches at the hand of man or other causes changed their condition from healthy and unpalatable wood to decaying and palatable matter; fit food for the worm! The first step, therefore, in the investigation is to ascertain whether the tree attacked is healthy or decayed—dying—dead. When the planter first notices the weevil he also notices the fact that the tree has changed its condition and *per saltem* he arrives at the conclusion that "an enemy (*Tomicus*) hath done this thing." Now to argue by analogy one who meets with a carcase of an animal filled with maggots may, with equal reason cry: "Behold the maggot (here insert a sonorous aristocratic name to make it look learned)—behold the maggot hath killed the animal"!—Yours truly, JAS. H. BARBER.

SANITATION ON ESTATES: COOLY LINES.

Kandy, April 10.

DEAR SIR.—In calling attention to the enclosed letter from the Colonial Secretary, I would endeavour to impress upon everymember of the Planting Community the importance of carrying out the injunctions referred to in a thorough manner. We can hardly estimate what a frightful calamity it would be if the Plague were to break out in our midst, and for every reason of interest as well as humanity, we should do our utmost to ward off the evil.—Yours faithfully, J. N. CAMPBELL,
Chairman, Planters' Association of Ceylon.

Colonial Secretary's Office, Colombo, 1st April.

Sir,—I am desired to inform you, as you are probably aware, that the attention of the Government and the energetic action of all local sanitary authorities have been specially directed at measures for the prevention of the introduction of the Plague and for its resistance if it should unhappily make its appearance in Ceylon.

2. The Governor feels that he can with confidence appeal to the proprietors of estates for their co-operation in seeing that their cooly lines are cleansed and whitewashed, inside and outside, and that all the drains in the neighbourhood of the lines are cleansed and kept in good sanitary condition. This duty is indeed imposed on Superintendents of estates by the section 20 of the Medical Wants Ordinance, No. 17 of 1880, and the Governor has no reason to suppose that it is not ordinarily observed. But at the present juncture it behoves those in charge of estates to adopt some extraordinary measures of sanitation and, with this view, a circular injunction is in course of issue by the Medical Department.

3. I am therefore to invite your attention to the subject and to ask the Association to use their influence and action in securing the adoption of such extraordinary measures.—I am, &c.,

(Signed). J. J. THORBURN, for Colonial Secretary.

To the Secretary to the Planters' Association, Kandy.

LABOUR SUPPLY FROM NORTH INDIA.

DEAR SIR,—I enclose a letter (copy) *re*-labour which I have received from India. This is the only way to break the back of the present Cangany system and monopoly, I have no doubt we shall be able eventually to get this kind of labour down from Calcutta at 10 rupees a head which will make it far cheaper than the present. Then you save all head money and Canganies' names; the Zemindars at R40 a month, say looking after the lot.—Yours truly, TRUTH.

April 11th.

True Copy.

Stephen, Dass & Co. Factors and Commission Agents, Indentors, Market and Produce Suppliers, Benares.

Benares, 3rd April 1897. Dear Sir,—We are in receipt of your kind favour of the 23rd ult. We are willing to supply you the coolies at R20 per head including our commission, females at R25. We trust that these rates will not be considered excessive now as labor is scarce, owing to the opening of

new Railway and canal works. The Railway fare from Benares to Calcutta is about R7 and we have not yet heard from the B. I. S. N. Co. what they will charge to land coolies in Colombo, per head. There is also the Asiatic line they may take them cheaper. If you will instruct us, we will make the necessary inquiries for you. You required 150 coolies. We can give you the full number, duly registered and indentured for your Island. The coolies eat rice and they are a hardy race. We will require an advance of at least R2,500 to send them. Yours faithfully, (signed) STEPHEN DASS & Co.

CEYLON TEA IN RUSSIA.

Kandy, April 12.

SIR,—Mr. Rogivue, writing from Moscow on February 14/26 gives an account of a two months' tour undertaken by his agent, a Mr. Stromberg in the course of which some 28 towns in the Baltic Provinces, ranging in population from 7,000 to nearly 200,000, were visited. In each town Mr. Stromberg interviewed the principal tea dealers and others, and also distributed samples and brewed and distributed tea in the cup at the Hotels. He was unable, however, to undertake public lecturing for various police reasons which might perhaps be overcome with time and money. Mr. Stromberg's conclusions are that though few of the trade were willing to take up Ceylon tea they all admitted its good qualities, but some doubted it (suiting the Russian taste) and they would be certain to deal in it if either (1) they were regularly and frequently visited and promised and given the liberal assistance in advertising or (2) they were offered equal advantages as to credit with China tea and could get a bigger profit or (3) they experienced a demand coming from their customers, the public. Mr. Rogivue remarks :—

"Now Mr. Stromberg and I have both concluded, and I think you will also see from the report on this journey, that of the three conditions which in our opinion would ensure the more complete and full conversion of this country to Ceylon tea, the third (that of making the dealers feel a demand springing up among their customers) is the most hopeful and also the soundest and most enduring when accomplished, although it is the most difficult and the slowest to show any result.

"To do this I think we should increase our efforts to keep the name of Ceylon tea and its most conspicuous merits continually before the public by the newspaper announcements, as done in previous years, only on a more extensive scale if possible and by opening, wherever possible, new shops for special sale of *Pure* Ceylon Tea in packets (retail) and continuing my never-relaxing search for agents to undertake the exclusive sale of *Pure* Ceylon Tea."

Mr. Rogivue concludes his letter as follows :—

"There is a matter to which I would beg the most earnest attention of all in Ceylon and that is, that from many independent sources I have heard complaints, among those who import your produce, that the quality of the tea is not what it used to be. I myself have noticed a falling-off in this respect, some marks which used to suit this market so well owing to their strength, and the appearance of the dry leaf being now so poor in both these respects that I have been obliged to give up importing them and find great difficulty in matching my old standards. As I have kept nearly all my old samples of teas I bought, I am able to make comparisons for a period extending over several years. The maintenance of the fine qualities which we advocate is naturally a *vital* question in the permanent conversion of new markets.

"I shall be very pleased to supply any Ceylon firm, who may desire it, with the addresses of direct importers of tea looked up by Mr. Stromberg."

Mr. Roguvie enclosed the following translation of a letter to a Russian newspaper dated 31st January, 1897:—

"Translation of a letter to the Editor appearing in the *Russkie Slovo* No. 30, 31st January, 1897 "To the best of my knowledge several newspapers have been lately advocating the closing of our ports to English ships in consequence of the Plague epidemic in India. Such an arbitrary measure is perhaps too strong, but it would not be at all too much to forbid, for the time being, the import of any food stuffs from India, such as for instance Ceylon Tea of which, according to the "Russian Telegraphic Agency," a large shipment has just been landed in Odessa. This tea is much appreciated and drunk amongst our people and is also, as I have heard, used to mix with other sorts of tea, not of Indian origin. We can very well do without this English product, for our friends, the Chinese, have always supplied us with their tea in sufficient quantities."—I am, sir, yours faithfully, A. PHILIP,
Secretary, Thirty Committee.

HILL TRAMWAYS COMMISSION.

Colonial Secretary's Office, Colombo, 12th April 1897.

SIR,—I am directed to forward to you the enclosed copy of a letter addressed to the Hon Mr. F. R. Saunders relative to the appointment of a Commission to report on Hill Tramways together with a copy of the report submitted by the Commission.—I am, sir, your obedient servant,
J. J. THORBURN, for Colonial Secretary.

Colonial Secretary's Office, Colombo, 6th Feb. 1897.

Sir,—With reference to the letter addressed by me to Messrs. Christie, Mackintosh, and yourself, bearing date the 3rd instant, I am directed to transmit to you the accompanying Commission under the hand of His Excellency the Governor and the Public Seal of the Island, appointing you to enquire and to report on the construction ot tramways in the Hill Provinces of Ceylon.

2. His Excellency will be glad if you will enquire and report :—(1) On the advisability of constructing tramways whether for steam, bullock or other traction in the hill districts ; (2) on their probable cost ; (3) on the probable financial result of their working ; (4) whether they could be constructed on the grant-in-aid system, and whether it would be desirable to encourage their construction by the means of private enterprise or of public companies, and if so, the shape which such encouragement (otherwise than by a guarantee of interest) should take ; (5) the roads, if any, on or alongside which such tramways should be constructed.

3. The Commission is empowered to order such surveys as may be necessary for the purpose of their enquiry.

I am, &c., (Sgd.) H. L. CRAWFORD, for Colonial Secretary.

The Hon Mr. F. R. Saunders, C.M.G.

THE HILL TRAMWAYS COMMISSION.

The Commission has held sittings at Colombo Hatton, Badulla, and Nuwara Eliya, and in addition to obtaining information and arriving at a decision on certain general points connected with tramways and hill railways, it has inquired into the following specific schemes:—

(*a*) Railway between Nanuoya and Nuwara Eliya, and an extension to Udapusselawa.
(*b*) Scheme for the Dikoya district.
(*c*) Do Dimbula district.
(*d*) Do Badulla-Passara district.
(*e*) Do. Pussellawa-Ramboda district.
(*f*) Do. Hewaheta-Maturata district.

Among the more general questions considered by the Commission the following may be noted:—

1. *The necessity for Hill Railways.*—Some of the witnesses, notably those in the Badulla and Udapussellawa districts, were inclined to regard increased railway facilities as being almost necessary, but the Commission's opinion, on the facts brought before it, is that in most districts the cart transport service is fairly efficient, and that railways, although desirable and wished for, cannot at present be said to be necessary.

2. *Tramway* vs. *Railway.*—Assuming as the definition of the former, a line having a grooved rail laid flush with the roadway, the Commission is of opinion that tramways are not suitable. The rail is a heavy and expensive one, and between the rails and on the outside of each rail paving stones or concrete would be necessary to maintain the evenness of the roadway and prevent a dangerous blocking of the groove. Apart, too, from the excessive cost involved by the use of a grooved rail, the Commission is of opinion that such rails are unsuited to the comparatively heavy, powerful engines required to work on the steep gradients and sharp curves which would prevail on all the lines.

3. *Nature of the Roads in the Hill Districts.*—Speaking generally, the Commission finds that the existing cart roads are not of a nature to be really serviceable as tracks for narrow-gauge railways. They abound in the sharpest of curves, and the gradients are so extremely steep, often for several miles on end, that, without deviations in the form of zig-zags, locomotives work without racks could not pull an appreciable load behind them. Working under the most favourable conditions, a locomotive on a gradient of 1 in 20 (and there are many miles much steeper than that) would, in addition to itself, pull less than twice its own weight, and in unfavourable weather much less, so that, after allowing for the weight of the vehicles the influence of curves, and a necessary margin to meet ordinary conditions, the actual net load moved would be small

The Commission has not sufficient information before it to express a decided opinion on the suitability of rack railways to surmount the long steep inclines, but obviously they would be much more expensive in construction.

The laying of railways on the roads would to a great extent unsuit them for heavy traffic, and the witnesses have differed as to the importance to be attached to this, although upon the whole they inclined to view the boon of a railway as being worth the partial sacrifice of the roads.

The estate factories have all been built in relation to the existing cart roads, and were entirely fresh alignments selected for the railways, new approach roads would be required to enable the traffic to get to the railway. This however, does not apply in the case of the Badulla scheme.

4. *Gauge of the Hill Railways.*—The Commission's conclusion on this point unhesitatingly is that the gauge to be adopted should be that of 2 ft. 6 in., which affords great advantages over the narrower gauge in the matter of locomotive construction. It is true that in some cases, at all events, a 2 ft. gauge would be more economical and more easily suited to the sharp curves, but as the Kelani Valley line (if constructed) is to be on a 2 ft. 6 in. gauge (and probably a large section of the northern line), there can be no doubt that the general economy and convenience of adhering to one gauge for all the branch lines would far outweigh the saving which might be effected in some cases by adopting a narrower gauge.

5. *Rates to be charged for Freight and Passengers.*—At the earliest stage of the inquiry it was quite evident that if the rates for freight now ruling on the Nanuoya extension were adopted for any of the schemes under consideration, the estimates would in all cases show a prohibitive loss on working. Nor is this to be wondered at; the volume of traffic to be dealt with on these feeder lines is naturally very much smaller and running a much shorter average distance than that of the trunk line, while the gradients to be surmounted are extremely adverse. It is obvious therefore that the cost both per train mile and per ton mile must be heavy. The Commission has taken as its basis of calculation the rates of cart hire ruling in the district from point to point, and all the witnesses and representative bodies have agreed that they are willing to pay these rates to the railway if constructed. The Commission recommends that such rates should be the ones charged until any line shows a substantial clear profit more than equal to the charges for interest and sinking fund. The Commission recommends that the passenger rates should be on the same scale as those levied on the Nanu-oya line, except in the case of the Nanu-oya-Nuwara Eliya section, where rather higher mileage rates should be charged.

6. *Prospects of obtaining all the existing Traffic.*—Experience in connection with some of the Ceylon Railways has shown that it is not always safe to rely on existing traffic finding its way to the railway. Once a railway has been constructed and its manifold advantages secured beyond recall, the traffic which was promised and reckoned upon has sometimes only in part been given to the railway. The Commission therefore recommends that the Government should refuse to enter upon any scheme unless the owners of the estates interested are prepared to agree that all their traffic will be placed upon the railway (at rates agreed upon), and, in order to give binding effect to the agreement, consent to the imposition of prohibitive road tolls on estate produce and supplies. It is gratifying to record that all the witnesses examined by the Commission readily recognized the fairness and desirability of such a precaution, and approved in their common interests of the proposal.

SPECIFIC SCHEMES INQUIRED INTO.

(*a*) *Nanuoya to Nuwara Eliya, and an Extension to Udapussellawa.*—This line would be approximately 18 miles in length (5½ to Nuwara Eliya and 12½ on to Ragalla). Two traces for a 2 ft. gauge line were made from Nanu-oya to Kandapola, the one by Mr. Waring and the other by the Public Works Department. Speaking of the section to Nuwara Eliya, the former adheres to the existing cart road, and its gradients consequently are so steep that a system of rack rails has to be introduced. There does not seem in this case to be any advantage gained by adhering to the road, and, indeed the Commission understands that Mr. Waring only did so in terms of his instructions. The other trace, which runs through Crown forest above the road, is unfortunately, not to be relied upon, and will have to be discarded. The Commission has asked that a new 2 ft. 6 in. trace be surveyed and staked out at once, and recommends that it should leave the Nanuoya station on the goods shed side only. This will involve passengers crossing by a subway, but will obviate the inconvenience and danger of having two lines crossing one another, both on steep inclines. The trace should follow the direction taken by the Public Works Department survey, and only utilize the one portion of the cart-road immediately below Blackpool bridge for a maximum distance of 40 chains. On entering the Nuwara Eliya basin it should trend to the right and pass round between the lake and the racecourse to a point below the Priory, where the station would be. This route (and site) is approved of by the witnesses examined, and it is convenient for the extension to Udapussellawa. That extension follows, with some deviations, the existing cart road the whole way to Ragalla, but it is understood that the first section—to Lover's Leap bridge—is not to encroach upon or injure the driving road. From Kandapola to Ragalla the road will have to be greatly given up to the railway. Of the various district schemes, this is the only one where the project of using the existing cart roads is feasible without extensive deviations. The road will be of great use nearly all the way, and between Lover's Leap bridge and Kandapola is well suited for a hill railway. From Kandapola down to Ragalla the road is steep, but a gradient of 1 in 26 can be got, and

it is hoped few, if any, curves will be less than 100 ft. radius.

The Commission favours this project because it is undoubtedly desirable that the town of Nuwara Eliya should be connected with Nanuoya and as the roads are fairly suitable the continuation of the line to Ragalla will give it a traffic and a length favourable to its successful working. This, too, is the only one of the schemes in which the approximate length of the line can at present be determined.

The estates traffic is easily ascertainable, and the figures for it, up and down, are quite reliable. The Nuwara Eliya traffic is calculated from tally returns of the present road traffic, and is less reliable. The estimated cost of construction will probably be found to be fairly accurate, and it is unlikely that the working charges will, on the average, be much less than 3·30 per train mile to Nuwara Eliya, and 2·50 beyond.

(*b*) *Dikoya District Scheme.*—The roads in this district are far from suitable, and there is one section, at Wanarajah bridge, where the gradient is 1 in 16 for 500 ft., with a short bit of 1 in 13. It is considered certain that the railway would not get the traffic of the side valleys unless branches were constructed up all the roads; this necessitates a relatively large mileage to serve the district, and the short branches will add greatly to the cost of working, which has been placed at the high figure of 3·25 per train mile. Mr Harcourt Skrine brought before the Commission a scheme to run narrow gauge lines from Watawala station up the Maskeliya and Dikoya valleys. Taking advantage of the natural outlet of these districts, the suggested lines would be on easy gradients, and save the traffic climbing up to Hatton station. There would be much to recommend the adoption of such a scheme if the railway had not already been constructed to Hatton with the object of serving these districts. At present, when there are districts much more in need of increased railway facilities than Dikoya and Maskeliya, the commission would not be justified in suggesting the construction of an alternative uotlet railway, even although it presented advantages over the existing outlet.

(*c*) *Dimbula District Scheme.*—This was a proposal to construct a line from Talawakele to Diyagama, 17 miles. The road is less unsuitable than the Dikoya roads, and the line, being without branches, could be more cheaply worked; but the mileage rates of cart hire are less than in Dikoya, and the revenue therefore is not so large as might have been expected. The Commission considers that this scheme will be found worthy of further investigation.

(*d*) *Badulla-Passara Scheme.*—The road between Bandarawela and Badulla was at once pronounced to be quite unsuitable (gradients of 1 in 15 abounding, and portions being as steep as 1 in 10 and 1 in 12), and it is evident that railway communication to these districts, which is much to be desired can only be given by adopting a trace independent of the roads.

The Commission strongly recommends that a survey should be made for a 2 ft. 6 in. gauge line, and unt l that is done the estimates of cost of construction and working must be considered as being but little better than guesses. The country is undoubtedly a very difficult one, and it is not possible to say what length of line might prove to be necessary to overcome the differences in elevation. The estimates of traffic and revenue are, particularly as regards the estates' share, quite reliable; but the question of the tonnage which at present travels between Madulsima and Batticaloa all finding its way to the railway would need to be a matter of definite understanding between the Government and the planters before the line was undertaken. The figures for last year show that about 600,000 lb. net of tea were shipped in 1896 from Batticaloa, out of an estimated total crop (Passara district) of 2,400,000 lb., while over 3,000 tons of Indian rice were imported at that port during the year.

Of all the schemes considered by the Commission, this Badulla scheme is the only one in which it is possible that any one might suggest an extension on the 5 ft. 6 in. gauge, and the Commission therefore thinks it well to point out that, while quite conscious of the evils of break of gauge on a continuation of a trunk line, or even a branch line, with heavy traffic requiring rapid transport, it is of opinion that for the types of branch lines coming within the scope of its inquiry, the inconveniences of break of gauge would be but little felt, and are far outweighed by the saving in first cost.

The fact that passengers have to change from one train to another is of no weight, as they often have to do so where there is no break of gauge.

The cost of transferring goods from one train to another is very small where labour is cheap and when the weight to be transferred does not exceed 20 to 40 tons per day, and that of easily handled goods. On this point attention is drawn to the evidence of Mr. Cantrell given before the Northern Railway Commission (Sessional Papers VI. of 1897, pp. 23 and 24).

There is no competition either in time or cost to be feared where consignors are prepared to have their roads barred for heavy traffic. On the freight rates per ton per mile, which vary from 30 to 75 cents, the cost of transferring will form a fractional charge.

In every scheme considered by the Commission it was clear that a standard gauge branch line would be so costly as to entirely preclude the possibility of its being constructed.

(*e*) *Pussellawa-Ramboda Scheme.*—The scheme as originally presented to the Commission includes three lines; 1, Gampola to Ramboda; 2, Gampola to Pooprassie; 3, Ulapane to Lower Ramboda; but a slight investigation showed that no case could be made out for Nos. 2 and 3, and the suggested line from Gampola to Ramboda is the only one worthy of consideration. In the sketch estimate annexed it will be seen that financially this scheme is one of the best, if the bulk of the Pundalu-oya traffic finds its way to the railway at Ramboda. It is not, however, clear to the Commission that those who now use the railway at Gampola would all bind themselves to use it at Ramboda if the extreme rate of 75 cents per ton per mile were enforced, and this is the rate quoted by the District Planters' Association, on which the revenue of the scheme is based. The cost of this line is rendered somewhat more uncertain than the others owing to the crossing of the Mahaweli-ganga at Gampola, which would probably necessitate a new and expensive bridge. The nature and extent of the deviations would have to be ascertained before it is possible to state how much the mileage of the railway might exceed that of the road distance.

(*f*) *Hewaheta and Maturata Scheme.*—This scheme, requiring a long mileage for a comparatively small tonnage, would not bear investigation. In the figures furnished to the Commission the Lower Hewaheta traffic was entered at a much larger figure than the Commission could accept, but in the summary of the scheme that unduly large estimate has been included.

7. The ommission concluded its inquiries regarding specific schemes with those just referred to, but in doing so the mmission does not imply that there are no other schemes worthy of consideration, or that its inquiry was exhaustive.

It was necessary that certain schemes should be inquired into, and in a rough way, their respective merits set out, and this has been done.

There can be no doubt that what is now required and generally wished for is that one line should be undertaken, and hereafter, when the knowledge gained by its construction and working is available, that the other schemes should be more definitely considered.

For the reasons which have been given in the sections dealing with the specific schemes, the Commission's recommendations to Government are—

(1) The construction of a 2 ft. 6 in. gauge line from Nanu-oya to Nuwara Eliya and Udapussellawa, subject, so far as the latter section is concerned, to

the conditions mentioned in paragraph 6 being adhered to.

(2) The survey for 2 ft. 6 in. gauge line from Bandarawela to Badulla and Passara.

March 24, 1897.

F. R. SAUNDERS.
THOS. NORTH CHRISTIE.
P. A. MACKINTOSH.

SKETCH ESTIMATE OF THE VARIOUS SCHEMES CONSIDERED BY THE COMMISSION.

Details.		Nuwara Eliya and Uda Pussellawa.	Dikoya.	Dimbula.	Badulla and Passara.	Pussellawa.	Maturata.
Acres in cultivation ..	Acres	9,877*	25,000†	24,071†	27,105‡	11,851†	—§
Estimated tea crop, 1897 ..	lb.	2,200,000	11,000,000	19,000,000	5,861,625	4,799,655	4,346,400
Mileage of suggested railway ..	Miles	18	27	17	36	21	40
Rough approximation of cost, including rolling stock ..	R	810,000	1,485,000	850,000	2,160,000	1,050,000	2,000,000
Interest and sinking fund at 4 per cent. ..	R	32,400	59,400	34,000	86,400	42,000	80,000
Cost of working ..	R	73,475	130,767	92,284	146,016	85,176	148,720
Total yearly debit ..	R	105,875	190,167	126,284	232,416	127,176	228,720
Anticipated revenue ..	R	93,578	128,351	90,358	225,481	127,360	175,717
Net annual deficit ..	R	12,297	61,816	35,926	6,935	—	53,003
Net annual profit ..	R	—	—	—	—	184	—

* Of this only 6,684 acres are in bearing, but as High Forest, with 1,300 acres in cultivation, the traffic of which would come on to the railway, is not included, the traffic as soon as the total acreage is in bearing will probably be quite 50 per cent. more than has been included in this estimate of receipts.

† Not the total acreage of the district, but only that which it is anticipated would use the railway.

‡ Of this only 23,348 in tea, and a large portion is not yet in bearing.

§ Not furnished by the District Planters' Association.

MEMORANDUM BY MR. P. A. MACKINTOSH.

Since the conclusion of the work of the Commission I have received from a well-known firm of Electrical Engineers in England, in reply to inquiries on my part, a list of electrical tramways or railways which they have equipped.

2. In this list there appears the case of the Bessbrook and Newry Railway, worked by electricity generated by water power through the medium of a turbine.

3. It has been in operation for 11½ years (although I had never heard of it, doubtless owing to its being such a short line), and it is claimed that it has throughout worked satisfactorily. The preponderance of the traffic is goods or minerals.

4. Some of the details connected with it I subjoin:—

Length of line	3 miles 2·4 chains.
Steepest gradient ..	1 in 50.
Available fall of water ..	28 ft. [very little].
Volume of flow of water per diem	3,000,000 gallons.
Average tonnage of goods carried annually ..	16,000 to 17,000 tons.
Average number of passengers carried annually ..	90,000 to 100,000.
Speed of trains	6 to 9 miles an hour.
Train mileage (in 1891) ..	21,468.
of cost haulage per train mile, of which nearly 40 per cent. was for rental of water power (in 1891)	3·94*d*.

5. It is stated that being an example of one of the earliest lines to be operated by water power, it is somewhat out of date, although it has operated successfully throughout; and certainly the cost of haulage seems to be extremely low.

6. This case at once suggests the possibility of working the Nanu-oya to Nuwara Eliya line through the medium of a turbine situated near Blackpool, utilizing the Nanu-oya in a similar manner, but with any improvements that may be possible. In the same way, for the line from Nuwara Eliya to Kandapola a generating station might be situated on the Kandapola-oya near Lover's Leap, while the section from Kandapola to Ragalla might possibly be treated in a similar manner from the adjoining stream, the capacity of which I am not, however, so confident about.

7. I think the matter is worth the serious consideration of the Government, and if they desire it, I will, during the progress of the survey now being begun between Nanu oya and Ragalla, have systematic gaugings of the three streams referred to taken before the rains set in, and levels taken to ascertain the available head of water, with a view to obtaining estimates, on the completion of the survey, for the equipment of the line for being worked by electrical power generated by water power

P. ARTHUR MACKINTOSH.

Avisawella, March 30, 1897.

MEMORANDUM BY THE HON. T. N. CHRISTIE.

Although I do not think that a slow speed train ascending steep gradients round sharp curves at all lends itself to electrical propulsion, I concur in thinking that the water in the streams should be gauged, and, if it occasions no undue delay, the question of the feasibility and cost of the scheme reported upon.

It must be borne in mind that the system of having a driver for each vehicle would not suit Ceylon conditions. No vehicle could be trusted to descend the gradients of the Nuwara Eliya line unless it was under the control of a driver of the same standing as the drivers on our existing line: and were one such required for each vehicle, the cost would be great. A system in which every vehicle, or almost every vehicle, had its own motor and yet the whole train was under the complete control of one driver, would, I think, be essential.

March 31st, 1897. THOS. NORTH CHRISTIE.

DEAFNESS. An essay describing a really genuine Cure for Deafness, Ringing in Ears, &c., no matter how severe or longstanding, will be sent post free.—Artificial Eardrums and similar appliances entirely superseded. Address THOMAS KEMPE, VICTORIA CHAMBERS, 19, SOUTHAMPTON BUILDINGS, HOLBORN, LONDON.

DUTCH BAY V. HARE ISLAND AS COOLY QUARANTINE STAITON.

We had only time recently to allude to the opening slip in Mr. Harcourt Skrine's long and, in the main, instructive as well as interesting letter. Clearly he knows as much about his subject as any one in or out of the island, unless it be Capt. Donnan and Mr. Ingramcotton. With Hare Island, Tuticorin, he has had an intimate personal acquaintance; but his statements about Dutch Bay, we infer, are made on hearsay and inference from popular notions of the locality and, therefore, as we said, his criticism and comparisons in this direction would have been better withheld, until the official Report on the recent official inspection and consultation had appeared. Nevertheless, it is quite possible that a useful purpose may be served by the appearance of Mr. Skrine's very full letter at the present moment when the whole subject is likely to be under the consideration of the Government.

Now, we do not profess to be in a position to discuss "Dutch Bay" in the familiar way in which Mr. Skrine treats of Hare Island. But we are certainly prepared to traverse some of his statements or inferences. He is probably unaware that while the richest coconut-growing and one of the most populous native regions in the island, lies between Negombo and Chilaw, beyond the latter station the same great industry has, of late years very rapidly extended in the direction of Puttalam. The Rajakadaluwa district on the Northern side of the Deduruoya is likely to be a specially favorite coconut district: it has been very largely taken up and estates seven years old and upwards are most promising. So much so, that the demand for land has carried wealthy enterprising natives and some Europeans well towards Puttalam; while our information goes to show that there is good soil and heavy forestland for some distance beyond that station. It is quite true that the annual rainfall of Chilaw does not exceed 54 inches and that of Puttalam 46 inches; but the coconut palm in many parts at least of those districts does not depend altogether on rainfall; for, there is water at no great depth in the soil—a brackish deposit in which the roots seem to luxuriate. So much for the character of the country in the Puttalam and Dutch Bay district and Mr. Skrine will understand that, personally, we should much prefer to see any line of railway run (not from Polgahawela or Kurunegala through a "miserable" country, but) from Colombo due North to Puttalam and Dutch Bay—a line that would pay splendidly for by far the greater part of the way, on its own local account. The cooly traffic would add to its success: coolies meant for upcountry would join at Kelani station, and there would be little difference in the journey, as Polgahawela is only a few feet above Colombo.

But this is all by the way. What we are chiefly concerned with today is to set Mr Skrine right in reference to Colombo and the cooly traffic. It is not only absolutely wrong, but almost childish, to write of the press or intelligent public of the capital as being opposed to the use of this port for cooly traffic *per se*, or to suppose that any such motive as *odi profanum vulgus et arceo* has actuated any section of our community in desiring to see a convenient and suitable separate cooly port established apart from the metropolis. Childish, we say, because there is assuredly no one in Colombo, official or unofficial, who has discussed this question, who is not as convinced as any planter can be, that on Cooly Immigration, more than on any other element, depends the prosperity of the Colony. Any policy calculated to check or discourage such immigration is only worthy of condemnation. But, on the other hand, let the planters remember that on the healthiness of Colombo—on steamers being able to call and go freely from this port with clean bills of health, depend issues of the greatest possible moment, directly affecting their great industry and equally striking at the prosperity of the island Now, it is in the interests of both elements to the prosperity of the Colony—free immigration and unrestricted steamer freight—that we should like to see a separation effected through the establishment of a distinct Cooly Port. Suppose, for instance, the plague was reported to have reached Madras and to be extending farther South, that indeed a case had reached Colombo, and that therefore the need for extremely restrictive measures was recognised on all sides, would not the liability to interfere with the cooly traffic be vastly increased, no matter what local quarantine arrangements were made? And, on the other hand, would it not be a vast relief on such a (plague) crisis arriving, to feel that cooly immigration could not be prejudiced, because it had its own port, quarantine station, and depôts in the island at a point widely separated from the metropolis? Our illustration so far, is that of a case of plague arriving here, through no fault of the coolies; but suppose, on the other hand, that a case or cases of plague were directly traceable to the coolies, how much more serious a thousand times such immigration would then become, when associated with, or in the vicinity of, a city like Colombo, over-crowded and insanitary in many parts in spite of all that is being done—than if the plague cases appeared among coolies landing at Dutch Bay or any other similar isolated cooly port? But Mr. Harcourt Skrine will reply to this—as indeed he has already done—that we cannot divest ourselves of such traffic at this port: "the coolies" (like the poor) must be always with us—always coming and going by hundreds, if not thousands, to such a city as Colombo. That is very true; but of how far less importance that the ordinary cooly traffic of the city should be hampered, or even temporarily suspended altogether, than that the large and vital flow of Immigration for the plantations should come under the ban of the Port Surgeons of the great central Mail-steamer Port of the East. On due reflection, we think it will be found that the planters ought to lead the way in asking the Government to provide, if at all possible, a separate, convenient, and accessible port for their coolies to and from Southern India, so as to relieve all concerned of the risks attending the use of Colombo.

OUR ESTATE SUNDAY SCHOOL.

(*Communicated.*)

Our Estate Sunday School is unique, has been both peculiar and erratic, for although it now dates back for several years since it was founded, yet it has not always been active, given alas! to hibernate, as a supply of teachers failed. We have had times when the pulse of its life was

thready and weak, and others marked by big bursts of enthusiasm, when a new rush of talent was fresh to the work, and zeal the predominant leaven. Then there have been visions of progress: a Christian peasantry with a Christian conscience about, and we have even effervesced in these halcyon days into a regular night school, and gone in for a lavish expenditure, in slates, first readers, chalk and a black board.

The youth of the Tamil race is, as a rule, bright, interesting and intelligent: is teachable, and can be led, and takes to a Sunday School at first out of pure curiosity, and when that curiosity is satisfied, deserts without a qualm. A new teacher on the old theme crowds the withering loft—which is the hallowed abode of our effort—and unless the teacher be wise, he may be misled, thinking that they are stretching out hands in the manner that used to be depicted as the attitude of the heathen on the cover of a juvenile missionary magazine we were supplied with in the distant past, and that they were thirsting and crying for knowledge. If the teachers' Tamil be halting that is rather an advantage. It keeps the children quieter and extends the reign of curiosity until they find out what he is talking about.

In our school every new teacher is allowed a free hand, all "isms" and "views" occupy the one platform, and opinion weighs nothing. When the teacher is very zealous, I find he generally begins at the beginning and the knowledge which the estate children have of the ante-diluvians is simply astonishing. Those whose policy in education is thorough, put in a lot of time over the Garden of Eden while "the father of all such as handle the harp and organ," and the "instructor of every artificer in brass and iron" are not unknown heroes. Life however, is short, and zeal often burns out, and it is not to be wondered at, that the later history of Israel is pretty much a blank, for the children's curiosity is easily satisfied, and there is a lot of dry stuff in the hoary past. We have had teachers who took instead, the times of Christ as their theme, and expounded the words of the Master; but it is but scrappy knowledge the children have of the Divine Teacher, and His life on earth has been told only in part.

There has been a tendency in all the teachers—especially towards the end of their career when the school deserters were many—to fall back on "the terrors of the law" as persuaders, and when this has become very marked, I have always taken it to mean the shaking of the dust from off the feet, and the preliminary to leaving, I don't know that it does the children any harm—as a rule, the school had become very thin before these lightnings play the bolder spirits unabashed playing outside—but then there is such a satisfaction for the teacher to feel that when his message has been delivered and not taken much notice of, that some one will have to pay for that later on. The youthful Ramasami hears of the abode of the damned unmoved: in the world into which he was born terror stalks about day and night: destruction may overtake him here and *now*, so that a nemesis in the future is rather an improvement.

Our teachers have had many plans to keep up the flagging interest. Some have suggested "no Sunday School, no rice," and this has worked admirably, and perhaps if it had been persisted in as a steady policy, the children might now have been able to take high marks in Scripture knowledge; but it did not commend itself to all, and indignation has been expressed at endeavouring to teach the children through the pangs of the stomach, rather than through the emotions of the heart.

To give an annual feast, the memory of whose richness, and the odour of whose savouriness was to permeate and influence the whole school year has been tried; but except for a few Sundays before the feast and one solitary Sunday after it, it might have been uncooked.

Picture books, and coloured tracts have been distributed: magic lanterns have been exhibited, and even a supreme effort made to win by a variety entertainment. This last was unique, and had a vista of such possibilities that I had a feeling—immediately suppressed of course—that it was not such a bad thing after all to be born a heathen. I had had a good deal of my moral grounding driven into me with a stick or slipper, and was made to march to school and prepare the lessons *nolens volens*, and no sugar piece in the matter; but here was my heathen horde, that used to have its rice stopped if it absented itself from school, soothed by sweets one day, pandered to by plaintains another, sustained by bread the next, and with the sure prospect of having its nakedness clothed later on, dancing ever before it. When a boy, I used to hear on high occasions in church, of "a feast of fat things" of "wines on the lees well refined," and wondered what in the world "wines on the lees, well refined" could possibly be, and have been wondering ever since. Can it be any thing like the above? If so, I argue, that the circle has been rounded and the end is near. If the variety entertainment fails, what else is there to fall back on, except to shut the door of the withering shed for good and acknowledge defeat. But on second thoughts I won't; as long as teachers can be got, the school *shall* remain open. It may not be a model school, nor run on any kind of lines likely to obtain the approval of the experienced, but our aim is limited, and if after many days there be but one from its number found heading for the higher life or any turning at all toward righteousness, it will be reward enough.

THE CACAO PEST.

ITS NAME WAS NEVER HEARD:—WAS SILENCE WISE?

"TROPICAL AGRICULTURE" of whatever branch, is well known to be an industry which involves many risks, but it has its compensations. For one thing it is unwise to prophesy about it; for, if "the swing of the pendulum" is unfavourable to the planter this year, it may be as much the other way later on. In the old coffee days it was not unusual to see the cultivator who was heavily indebted relieved of his worrying incubus by two or three good crops; while there was the other side, too, in which money was lost hand over fist. Cacao, during its short career in the island, has not been free from similar vicissitudes. We have had low prices, succeeded by a halcycon time when those who had cacao gardens looked upon every other product of the East as not in the race with the "food for gods," and were inclined to think, that they had found at last the ideal tropical product. This season of bright-eyed hope was alas! followed by collapse of prices! markets slipped away from us. Countries, which had imported largely, began to export cacao, and from the top figures of 130*s* to 140*s* a cwt., the

rates receded to 60*s* or less, and reports came from London, that some kinds could not be sold at all, except at a ruinous sacrifice. It was another lesson to the sanguine planter of the need of caution.

When prices got low, cacao was not so much heard of, and when there was the added horror of trees clothed in verdure, and often laden with clustering crop, going out in patches, there was less said about it than ever. Those men immediately concerned were shocked and surprised, and bustling about, set their brains a working to devise means for checkmating further inroads. Applications of white-wash, kerosine oil, tar, and insecticides had each their day; affected and dead trees were rooted out and burnt; "poochees" were hunted for; botanical authorities interviewed and questioned; inquiries made here and there, as to what others were doing, but nothing to any good purpose—and things were allowed to go on.

Through some occult reason the subject was tabooed in public; most people seemed to know of it and yet it was never discussed; and the press, which ought to have been supplied with the information, was singularly free from any comments on the new horror, and when it *was* referred to, it was not in a way to cause any alarm. Even the latest Report of the Planters' Association is quite mealy-mouthed in its short paragraph on cacao—the watered-down result of a rather pessimistic paper which had been sent in—so we hear—but voted by some cacao men as disturbing and extreme.

Has this conspiracy of silence been wise? Now the trouble in cacao is becoming so general and so serious, that a specialist has been promised by the Government to investigate and advise; but many cacao planters feel that his work—if full value were to be got from it—ought to have been completed by now, instead of all having yet to be done. Ignorance still reigns, trees go on dying, and many more are marked out for death; planters do not know what to do, and the Specialist, who is to help, is not yet above the horizon, there is only the promise of his coming; while our local Entomologist, notwithstanding his able work, is not offered the opportunity of inspecting estates affected! Of course, in a land like this, where the "poochie" is so much in evidence, and comes and goes according to its own laws and seasons, if the trouble affecting the cacao were a "poochie," hope was ever ready to suggest the possibility of a natural change of conditions, bringing about a cure, or at least a mitigation. Cacao property was depressed enough with the low prices, and to bring into any kind of prominence this obscure and unknown ravisher, about whom so little was definitely known, was thought as being unnecessarily to alarm the monied class, and deemed unwise. Still it was known that cacao was a sensitive and tender plant which demanded and quickly responded to care, and that the red variety—which is suffering most here—had all but disappeared from the West Indies years ago, and the planters ought to have been particularly awake to signs of weakness in that direction and been more open. The land was not barren of counsellors. Planters got so much advice as to what should be done, by people who were not a bit wiser than themselves, that they would have been kept busy all the year round if they had followed a tithe of it. What they wanted, however, was not empirical counsel. Some, we fancy, were sick enough of experiments and would have been pleased to follow authoritative advisers. Had the Scientist, which the Planters' Association asked for a year or two ago, been appointed at that time, his services at present would have been invaluable. There would have been no hesitation in consulting him, and his quietly working out the life history of the cacao pest, would not have attracted half the attention of calling in a Specialist from home.

Now that His Excellency has so readily agreed to the employment of a cacao expert, we trust that there will be as little delay as possible in setting to work. We still think Mr. E. E. Green ought to be asked to give a preliminary Report, or to consult with other local authorities; but, in any case, if a Specialist is to be got from England, we trust when he does come he will speedily get to the root of the matter, and put the puzzled and suffering cacao planter on the track o his enemy.

THE BORING BEETLE INFESTING CACAO.

Under date the 13th instant, Mr. E. E. Green writes to us:—"Under separate cover I forward a bulletin from the U. S. Department of Agriculture. In it you will find a paper upon the *Scolytidæ* of the United States. I have marked several passages that may be of interest to your readers as bearing upon the boring-beetle infesting our cacao,—which belongs to this family." We quote the passages marked by Mr. Green:—

THE AMBROSIA BEETLES (*SCOLYTIDÆ*) OF THE UNITED STATES.

BY H. G. HUBBARD.

The term ambrosia beetles is here used as a convenient one to distinguish from the true bark-borers and bark-eaters the timber-boring Scolytidæ, which push their galleries deeply into the wood, and which feed upon a substance called "ambrosia."

The galleries of the bark-borers are superficial and lie within or just under the bark. The galleries of the ambrosia-eating beetles penetrate into the wood, and in all their ramifications are of uniform size and free from wood dust or other refuse.

Their food consists not of wood, but of certain minute and juicy fungi propagated on the walls of their galleries. The action of the fungus produces a stain in the wood, giving to the galleries the appearance of having been bored with a red-hot wire. These characteristic "black holes" serve to distinguish their work from that of all other deep-boring timber beetles.

All the growing parts of the fungus are extremely succulent and tender. When the plant is in active growth, the fungus appears upon the walls of the galleries like a coating of hoarfrost.

Various disturbances of the conditions necessary to its growth are apt to promote the ripening of the fungus, and this is a danger to which every colony of ambrosia beetles is exposed. If through any casualty the natural increase of a populous colony is checked, there results at once an overproduction of the ambrosia.

It accumulates, ripens, and discharges its spores, choking the galleries and often suffocating the remaining inhabitants in their own food material. The same results may sometimes be brought about by closing the outlets of the galleries through the bark, or by spraying into them kerosene or some other noxious liquid. The inmates of the colony are thereby thrown into a panic, the beetles rush hither and thither through the galleries, trampling upon and crushing young larvæ and eggs, breaking down the delicate lining of ambrosia on the walls of the brood chambers and puddling it into a kind of slush, which is pushed along and accumulated in the passage ways, completely stopping them in places. The breaking down of the food fungus follows and in a few days the

galleries are filled with a paste-like mass of granules or spores, or with threads of mycelium, in which the living insects are suffocated and destroyed.

INJURIES CAUSED BY AMBROSIA BEETLES TO LIVING PLANTS.—As a rule, populous colonies of these beetles and galleries so numerous and extensive as to be capable of doing serious harm are found only in trees, which before the attack began were sick unto death with maladies for which the timber beetles are in nowise responsible. The few species which enter the sapwood of vigorous trees do not form large colonies, and the effect upon the health of the tree is not appreciable. One or two species, it is true, have the habit of sapping the life of twigs or small branches with an encircling burrow, and a species of Corthylus does considerable injury in this way to young trees and to shrubbery in the forest.

REMEDIES.—From what has been said of the nature of the food of these beetles, it is evident that any method by which the entrances to their galleries in the bark can be closed will effectually put an end to the progress of their colonies.

Perhaps the best means of accomplishing this is by coating the trunks with dendrolene or raupenleim. A light brushing or spraying of the bark with creosote or kerosene will sometimes accomplish the same result, especially at the beginning of an attack. But this cannot be depended upon to permanently protect the trees.

COFFEE ON THE STRAITS: CEYLON PLANTERS TO THE FRONT.

We quote from Report by the Acting District Magistrate, Mr. B. Berkeley Kuala Kangsar, for February:—"Walked to Choping where there is some very fine coffee, six years old, and a big area being planted, and on to Tepus and Blanja." Also from report by the Acting District Magistrate, Krian, Mr. R. C. Grey for February:—"On the 19th I drove to Alor Pongsu with the Collector of Land Revenue, and there met the penghulus of Bagan Serai and Briah, and some applicants for land in the direction of Briah. We walked to Kuala Briah, and then went up stream some distance by boat to see the lie of the country. The land here is all apparently suitable for *bendang* cultivation, and I am informed that further up stream good land for coffee may be found, but we were unable to go far up the river on this occasion." Also from report by the assistant district magistrate, Tanjong Malaim, Mr. Hamilton for February:—"Mr. Tait has planted about 75 acres of coffee since October. He is pushing on with further clearing rapidly. The estate looks very well, and the young plants healthy. He intends putting in a few acres of tobacco as a trial crop shortly. One hundred and seventy-four acres were demarcated during the month, leaving a total of 527 acres undemarcated. The most important item during the month was the prospecting done by Europeans on the Klanang Road. The land here, the excellence of which had hitherto been known solely to native planters (mostly Javanese), having satisfied the prospectors, two applications for five hundred acres each were put in by Messrs C. R. L. Learmouth and J. D. Toynbee. Very shortly after this Mr. W. Greig came down and, after careful prospecting, forwarded three more applications for 640 acres each, from Messrs. F. H Wiggin, H. M. Picken (both of Ceylon), and himself, respectively. Thus the aggregate of applications from Europeans during the month amounted to 2,920 acres, and as these applications are all for land on the south side of the Langat, where no applications from Europeans have yet been received, the importance of this new accession to the planting interest of the district can hardly be overestimated. It will certainly make all the difference to Jugra, which with a road to Kuala Klang, may now certainly be expected before many years are passed to develop into fair-sized market town, supplying the needs of the agricultural population which is beginning to accumulate at Klanang, Morib and Batu on the coast, as well as the inhabitants of the more thickly populated mukims of Bandar, Jurga, Telok Penglima Garang, and Tanjong Duablas. On Monday (15th) I accompanied Messrs. Greig and Nissen, on a visit to Tanjong Ru. Arriving at this well-known point in the afternoon, after a long row and a walk along the sandy beach, we penetrated for upwards of a mile into the mangrove, but though we came upon small stretches of land where nibong and rattan were growing, the land appeared to be too low in this locality to grow anything but coconuts, and we had no time to reach the higher land in the interior of the island before nightfall, and so returned to Jugra. Next day (16) Messrs. Greig and Nissen visited Morib, and on Wednesday they went up by river to the river end of the Sungei Buaia Road and returned overland, reporting the upper end of the roads as being in a very bad state. I had no time to accompany them being engaged on the annual report. During the rest of the week Mr. Greig was prospecting at Klanang; Mr. Nissen returning to Klang on the 19th."

"TEA PRODUCING COMPANIES OF INDIA AND CEYLON."

Such is the title of a compact volume received by the mail from the compilers Messrs. Gow, Wilson & Stanton, the well-known Tea and Share Brokers of Rood Lane. The book is one of 172 pages octavo and as it shows the history and results so far of all the Indian and Ceylon Tea Companies, capitalised in sterling, it cannot fail to prove useful. From the preface we copy wo sets of figures of interest :—

1895	Acres under Tea.	Acres in bearing.	Labour emplyed.	Crop prodnced lbs.
Indian	450,000	375,000	600,000	135,500,000
Ceylon	305,900	262,000	290,000	98,000,000
	755,000	637,000	890,000	233,500,000

The following is a summary of the capitalisation and of the working results of the year 1895 of 56 Indian Tea Companies, which may be said to be in *full working order*, and consequently their aggregate figures have a value as establishing some sort of a standard :—

Number of Companies	Extent of Cultivation	Paid-up capital involved and debentures subscribed	Cost to company per acre	Crop produced	Av. lb. per acre	Total profit earned	Profit per lb. of Tea	Profit on captal employed
	Acres	£	£	lbs.		£	d	£
56	152,547	6,907,000	45	58,476,182	425	538,349	2·21	7 15 7 %

A similar representative table cannot be given for Ceylon, as so many of the Companies are interested in other products besides tea.

Another quotation is encouraging :—

In regard to the future of the industry, two features present themselves for consideration :—*First.*—It may be taken that there is a natural average increase in the consumption of tea in this country to the extent of from 4,000,000 to 5,000,000 lb. per annum, and *Secondly.*—That markets outside the United Kingdom are continually expanding in the use of Indian and Ceylon Tea.

Then follow the 100 pages with particulars of Indian Companies, while a second division deals with some 52 Ceylon Companies alphabetically arranged, giving as a rule capital, debentures, name of directors &c., history, situation and area, results and dividends, and about accounts, voting

power, transfer forms, &c. We take the following notice from the *Home and Colonial Mail* :—

THE TEA-PRODUCING COMPANIES OF INDIA AND CEYLON.

Under the above title Messrs. Gow, Wilson, and Stanton, who are tea share brokers as well as tea brokers, have issued a handy volume, which will be of great value to investors in tea shares and all interested in tea. It gives the history and results of the tea-producing companies of India and Ceylon, which are capitalised in sterling. In a preface to the volume it is pointed out that about £35,000,000 of British capital is invested in tea, and the book gives the most interesting *personnel* and data based on the latest obtainable results of the working of these companies. Attention is called to the fact that tea companies have been seldom saddled with extravagant promotion expenses, that nearly all these tea concerns are directed by business men and not mere guinea pigs, and also that these companies place unusually full and lucid yearly accounts before shareholders. These and other facts concerning the development of the tea industry, known perhaps to many of our readers, but not to the general public, cannot fail to prove of the greatest value in stimulating the interest of the investing public in tea. The book is most welcome, and we congratulate Messrs. Gow, Wilson, and Stanton upon its compilation and issue. It is published at the price of one guinea.

We have grumblers sometimes about the price of a Ceylon Handbook and Directory of 1,200 to 1,500 pages; but we feel sure merchants and others do not grudge the guinea for this book of 172 pages.

KELANI VALLEY TEA ASSOCIATION, LIMITED.

The following is from the report of the board of directors, to be presented to the shareholders at their eleventh annual ordinary meeting, to be held at the office of the company on the 13th inst. The directors herewith submit to the shareholders the report and accounts of the company for the year ending December 31, 1896. During the past year no additions have been made to the company's acreage, but about 50 acres of native lands have recently been bought in order to obtain a satisfactory site, with good water power, for the new joint factory for Wereagalla and Parusella, which will shortly be erected in place of the factories now existing on the two estates, and which will tend to economise the cost of manufacture. The total crop secured from the four estates amounted to 6,38,145 lb., against an estimate of 566,000 lb., and showed an increase compared with that of 1895 of 40,950 lb. of tea, while the average yield for the four estates was 615 lb. an acre. The factories and machinery continue in efficient order, but as on previous occasions, the directors have written 10 per cent off their cost for depreciation, and the amount, £670 1s 6d, appears in the account. Although the crop is in excess of the estimate, and of that secured last year, the results of the company's working have not been so satisfactory as might have been expected, and show a considerable shrinkage from those realised in 1895, which is to be accounted for : 1. Owing to the Degalessa tea having, for a time, not maintained its usual standard of quality. 2. By lower markets and higher rate of exchange. 3. By reduction in the Ceylon receipts from the manufacture of tea for neighbouring estates, and owing to rice having been supplied to the labour force at its approximate cost. The company's net profits for the year, after deducting the sum of £670 1s 6d written off for depreciation, amount to £1,664 13s 5d, which with £118 11s 8d brought forward from last account, leaves £1,783 5s 1d to be now dealt with, and this it is proposed to appropriate as follows: Amount as above, £1,783 5s 1d; interim dividend of 5 per cent paid in September absorbed £813 5s.—It is now proposed to pay a final dividend of 5 per cent. (free of income tax), making 10 per cent for the year, £813 5s; leaving a balance to carry forward of £156 15s 1d. In accordance with the articles of association, Mr. Donald Andrew retires from the board, and being eligible offers himself for re-election. Mr. J. B. Laurie, C. A., offers himself for re-election as auditor. —*H. & C. Mail*, April 2.

THE STANDARD TEA COMPANY OF CEYLON, LIMITED.

Sixth Report of the Directors to the Shareholders. To be submitted at the general meeting, to be held on Wednesday, 14th April, 1897, at noon, at the Offices of the Company.

The Directors submit Statement of Accounts to 31st December, 1896. The Profit and Loss Account shows a profit on the working of the Estates in Ceylon of £12,317 11s 9d, which with amount brought forward from last year, less interest and home charges, shows a sum of £11,700 7s 11d available for division. In August 1896, the Directors, under the powers entrusted to them distributed an interim dividend for the six months ending 30th June, 1896, of 5 per cent. (10 per cent. per annum), absorbing £2,800. They now recommend a Dividend at the rate of 10 per cent. (making 15 per cent. for the year) absorbing £5,600; the placing £1,000 against depreciation; £1,500 to reseve; and the carrying forward to the next year £800 7s 11d. The results are not quite so favourable as last year, owing chiefly to less coffee and to higher Exchange. Still the Directors consider the results good, for it was always foreseen that coffee would sooner or later die out, and that Exchange was liable to be far less favourable.

The coffee produced in 1896 was about 321 cwts., which realised about £1,400, or less than half of the produce of 1895. The average Exchange for the Company as drawers in Colombo was 1/2 19-32nd against 1/1¼ in 1895, and 1/1 13-32nd in 1894. The difference in 1896 unfavourably affected the accounts to the extent of about £1,000. The Tea from the Company's Uda Pussellawa properties sold during 1896 maintained in Mincing Lane the same distinguished position it has hitherto occupied It realised more per lb. in 1896 than in 1895, though the market average for Ceylon Tea was lower. For this much credit is due to the Manager at St. Leonards.

Mr. NORMAN GRIEVE, who has had occasion to travel in the East, availed himself of the opportunity of visiting Ceylon and of inspecting the Company's properties. He reports well of them and of the Estate Managers he saw.

Coneygar of 176 acres, of which 169 acres are under Tea, has been bought from Colonel E. A. Butler, as from 1st January, 1897, or, perhaps, it would be more correct to say, that Colonel Butler has contracted to join and to sell his Estate to the Company for 350 shares of £10 fully paid. The Directors consider this a fair contract, and expect the place to work in well with Gordon and St. Leonards, between which Estate it is situated.

The Company's Properties at the close of 1896 were 3,290 acres, with 1,519 acres of tea considered in fully bearing, viz :—

in Uda Pussellawa—				
St. Leonards	726	acres.	238	acres. Tea bearing.
Liddesdale	814	,,	140	,,
Eskdale	240	,,	208	,,
Gordon	386	,,	154	,,
Tulloes	419	,,	165	,,
in Up. Maskeliya—				
Gouravilla & Up. Cruden	705	,,	614	,,

There are also 160 acres Tea in partial bearing, and some 601 acres in addition planted with Tea. On St. Leonards, Liddesdale, Gordon and Tulloes Estates there is still a certain amount of Coffee interspersed through the Tea.

Mr. ROBERT KAY-SHUTTLEWORTH, the Director who retires by rotation, being eligible, offers himself for re-election. By Order, A. TRAFFORD BROOKE, Secretary.

25, Fenchurch Street, London, 31st March, 1897.

COLOMBO PRICE CURRENT.

(*Furnished by the Chamber of Commerce*).

Colombo, April. 27th, 1897.

EXCHANGE ON LONDON: CLOSING RATES, *Bank Selling Rates*:—On demand 1/3 1-32; 4 months' sight 1/3 1-16; 6 months' sight 1/3 3-32. *Bank Buying Rates*:—Credits 3 months' sight 1/3 3-16; 6 months' sight 1/3¼ to 9-32. Docts 3 months' sight 1/3 7-32; 6 months' sight 1/3 9-23 to 5-16

COFFEE.—Plantation Estate Parchment on the spot per bus., R16·25 Scarce. Estate Crops in Parchment, delivery no quotations. Plantation Estate Coffee, f.o.b. on the spot per cwt. R85·00 Scarce. Liberian parchment on the spot per bushel, R8·00 scarce. Native Coffee f.o.b. per cwt. R64·00.

TEA.—Average Prices ruling during the week Broken Pekoe, per lb. 46c. Pekoe per lb. 35c. Pekoe Souchong per lb. 28c. Broken mixd and Dust, per lb. 24c. Averages of Wednesday's sale.

CINCHONA BARK.—Per unit of Sulphate of Quinine per lb 03.

CARDAMOMS.—per lb, R2·50.

COCONUT OIL.—Mill oil per cwt. R13.25. Dealers' oil per cwt. R13·00 Coconut oil in ordinary packages f.o.b. per ton R295·00

COPRA.—Per candy of 560 lb. R34·50

COCONUT CAKE: (Poonac) f.o.b. (Mill) per ton, R70·00

COCOA.—Unpicked and undried, per cwt. R45·00.

COIR YARN.—Nos. 1 to 8 { Kogalla R18·00 / Colombo R16·00

CINNAMON.—Nos. 1 & 2 only f.o.b. 67c. Very scarce.
Do Ordinary Assortment, per lb. 63¼c do

EBONY.—per ton No sales.

PLUMBAGO:—Large Lumps per ton, R340; Ordinary Lumps per ton, R320; Chips per ton, R180. Dust per ton, R120 } Market very firm & ad'cing

RICE.—Soolye per bushel, R3·70 to 3·75
" per bag, R9·80 to 11·05
Pegu and Calcutta Calunda R10·00 to 11·15
Coast Calunda per bushel, R3·73 to 4·25
Muttusamba por bushel, R3·85 to R4·55.
Kara per bushel, R3·65
Rangoon Raw 3 bushel bag.—R11·50

FREIGHTS.

Cargo.	Per ton London per str.	N. York per str.	Trieste per str.	Mar'lles per str.	Hamb', Bremen &c.
	s. d.	s. d.	s. d.	R. c.	s. d.
Tea	20/	31/3	22/6	25	20/
Coconut Oil	..	31/3	22/6	25	20/
Plumbago	15/	31/3	22/6	25	20/
Coconuts in bags	..	31/3	22/6	25	20/
Other Cargo	17/6	31/3	22/6	25	20/
Broken Stowage	10/	..	..	..	..
SAILERS.					
Coconut Oil	..	30/		..	..
Plumbago	..	28/9	..	..	..

LOCAL MARKET.

By Mr. A. M. Chittambalam, 7, Baillie St., Fort

Colombo, April 13th, 1897.

Garden Parchment :— Scarce per bushel
Chetty do :— (Nominal) R13·25 to 13·50 do
Native Coffee Scarce:— R65·00 to 66·00 per cwt
do f.o.b. do :— R70·00 to 71·00 do
Liberian Parchment, R12·50 per bushel (nominal)
do Coffee R63·00 to 64·00 per cwt
CARDAMOMS.— R1·50 to 2 per lb (nominal)
COCOA.—(nominal) R30·00 to 45·00 per cwt do
RICE.—Market is quiet :—
Kazla (Scarce)
Soolye R9·25 to 10 per bag
Callunda (Scarce)
Coast Callunda (Scarce) 3·75 to 3·87 per bushel
Kara 3·68 to 3·80 do
Muttusamba 3·75 to 4·25 do
CINNAMON.—Quoted Nos. 1 to 4, at 62c and Nos. 1 and 66 cents per lb (nominal)
CHIPS.—R85·00 to 87·50
COCONUTS.—Ordinary R32 to 38 per 1,000 (nominal)
do Selected 40 to 44 do do
COCONUT OIL. 13·00 to 13·25 per cwt do

COPRA.—Market steady :—
Kalpitiya R41 to 42 per candy
Marawila 38 to 40 do
Cart Copra 33 to do
POONAC.—Gingelly 90 to ton
Chekku 95 to 10 do
Mill (retail) 70 to 75 do
EBONY.—quotations at R100 to R195 (nominal)
SATINWOOD.—cubic feet 2·00 to 2·25 do
HALMILLA.— do 1·25 to 1·50 do
KITUL FIBRE.—Quoted at R28·00 per cwt (nominal)
PALMYRA FIBRE.—Quoted nominally :—
Jaffna Black.—Cleaned (Scarce)
do Mixed R16·00 to 17·00 per cwt.
Indian do R7·00 to 9·00 do
Do Cleaned 10·00 to 14·00
SAPAN WOOD.—Quoted 45·00 to 50·00 per ton
KEROSINE OIL—American 7·50 to 7·55 per case
do Bulk Russian 2·72 to 2·77 per tin
do Russian in Cases R5·90 to 5·95 per case
KAPOK.—Cleaned f. o.b :— R29·00 to 30·00 per cwt
do Uncleaned Scarce do
Croton Seed do do
Nux Vomica 2·50 to 3·00 do

CEYLON EXPORTS AND DISTRIBUTION

1896-97.

COUNTRIES.	Coffee cwt Plan-tation	Coffee cwt N'tive	Coffee cwt Total.	Cinchona. 1897 B'nch & Trunk lb	Tea. 1897 lb.	Tea. 1896 lb.	Cocoa cwt.	C'moms lb.	Cinnamon. Bales lb.	Cinnamon. Chips lb.	Coconut Oil 1897 cwt.	Coconut Oil 1896 cwt.	P'bago 1897 cwt.
To United Kingdom ..	3774	..	3774	19041	29533808	26831004	14466	126902	425633	133977	19513	29916	49207
" Austria	247	2	249	..	17?5	2295	..	..	5100	16?00	1369	10425	..
" Belgium	..	1	1	..	2375	3440	53	..	28400	52610	..	904	9792
" France	599	..	599	..	18529	16785	121	...	20000	6160	..	..	202
" Germany	115	..	115	..	54130	32795	54	26660	129945	134842	..	2744	18095
" Holland	58	..	58	..	3705	1845	..	..	..	..	..	..	..
" Italy	..	..	.	..	795	1231	..	..	29900	38080	..	103	1
" Russia	..	..	..	..	102683	159597	..	..	..	..	...	26	..
" Spain	..	..	..	..	3600	19140	..	..	25000	..	...	208	..
" Sweden	..	..	...	..	7699	..	..	..	..	..	..	..	306
" Turkey	..	..	..	..	1790	5562	...	..	..	..	.	..	..
" India	25	..	25	...	163927	354321	5	31710	61	...	39643	12453	60
" Australia	1565	..26	1591	..	3752955	3446709	60	25	..800	11640	979	324	360
" America	..	..	...	178169	213201	90907	..	..	20000	..	10018	9513	25669
" Africa	..	..	..	..	57680	39634	..	..	..	..	..	..	..
" China	40	..	40	12535	114614	40075	..	..	..	..	204	1623	56
" Singapore	..	..	-	..	8050	31751	168	..	..	..	15555	15440	..
" Mauritius	..	..	...	..	...	2490	..	..	..	..	..	..	..
" Malta	..	..	..	..	3000	33300	..	..	..	..	..	..	..
Total exports from 1st Jan. to 27th April 1897	6423	29	6452	209745	34044296		14927	185297	684839	394139	87281		103748
do 1896	7314	918	7508	255614	31112881		14596	115940	533 91	3 1887	83 79		104408
do 1895	22994	378	23912	259486	26885860		13730	160452	461845	216084	86230		57392
do 1894	8060	85	8145	697728	24087243		7789	112519	415550	96682	93577		75314

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, April 7th, 1897.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine ..	Fair to fine dry ...	44s a 120s
Zanzibar & Hepatic	Common to good ..	11s a 76s
BEES' WAX,		
Zanzibar & Bombay { White ..	Good to fine ...	£7 a £8
{ Yellow...	Fair ..	£6 a £6 10s
Mauritius & Madagascar..	Dark to good palish .	£5 15s a £6 7/6
CAMPHOR, China ...	Fair average quality ..	105s
Japan ..	,, ,, nom...	110s
CARDAMOMS, Malabar..	Clipped, bold, bright, fine	3s a 3s 1d
	Middling, stalky & lean	2s 6d a 2s 9d
Ceylon.—Mysore ...	Fair to fine plump ..	2s 6d a 3s 6d
	Seeds ...	3s a 3s 6d
,, Tellicherry...	Good to fine ...	2s 9d a 3s
	Brownish ..	2s 6d
,, Long ...	Shelly to good ...	2s a 2s 6d
,, Mangalore..	Med brown to good bold	3s 6d a 3s 9d
CASTOR OIL, Calcutta..	1sts and 2nds ...	3½d a 4½d
Madras ...	...	3½d
CHILLIES, Zanzibar ...	Dull to fine bright ..	20s a 37s 6d
CINCHONA BARK.—		
Ceylon ...	Ledgeriana Chips ...	1d a 3½d
	Crown, Renewed ..	2d a 4½d
	Org. Stem	1¼d a 3d
	Hybrid Root ...	2¼d a 2½d
	Chip ...	1¼d a 2d
CINNAMON, Ceylon 1sts	Ordinary to fine quill...	11½d a 1s 6d
2nds	,, ,, ...	10½d a 1s 5d
3rds	,, ,, ...	10½d a 1s 4d
4ths	,, ,, ..	9½d a 1s 1d
Chips	Fair to good ..	3d a 3¼d
CLOVES, Penang ...	Dull to fine bright bold	4½d a 7d
Amboyna ..	Dull to fine ...	3d a 4½d
Zanzibar }	Good and fine bright ..	2 7-16d a 2¾d
and Pemba }	Common dull to fair ..	2½d a 2⅝d
Stems ..	Fair ..	1d
COCULUS INDICUS ...	Fair ..	3s 6d
COFFEE ...		
Ceylon Plantation	Bold to fine bold colory	114s a 121s
	Middling to fine mid .	108s a 113s
	Low mid. and low grown	98s a 106s
	Smalls ...	9's a 101s
Native ...	Good ordinary ...	60s a 75s
Liberian ...	Small to bold ...	55s a 70s
COCOA, Ceylon ..	Bold to fine bold ...	71s a 82s 6d
	Medium and fair	52s a 68s
	Triage to ordinary ...	30s a 60s
COLOMBO ROOT... ...	Fair to good ..	20s a 22s 6d
COIR ROPE, Ceylon ...		nominal
Cochin ..	Ordinary to fair .	£10 a £16
FIBRE, Brush ..	Ord. to fine long straight	£10 a £21
Cochin ...	Ordinary to good clean	£15 a £21
Stuffing ..	Common to fine ..	£5 a £6 10s
COIR YARN, Ceylon ..	Common to superior	£12 a £26 10s
Cochin ...	,, ,, very fine ...	£12 a £34
do. ..	Roping, fair to good ..	£10 10s a £13
CROTON SEEDS, sifted...	Fair to good ...	35s a 86s
CUTCH	Fair to fine dry ..	9s 3d a 32s 6d
GINGER, Bengal, rough	Fair ...	15s 6d
Calicut, Cut A	Good to fine bold ..	56s 6d a 85s
B & C	Small and medium ..	31s a 60s
Cochin Rough...	Common to fine bold ..	27s a 36s
	Small and D's ...	10s a 25s
Japan ..	Unsplit ...	18s
GUM AMMONIACUM ...	Sm. blocky to fine clean	17s a 36s 6d
ANIMI, Zanzibar...	Picked fine pale in sorts	£10 7s 6d a £13
	Part yellow and mixed	£7 17/6 a £10 10s
	Bean and Pea size ditto	70s a £7 12/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	90s a 137s 6d
Madagascar ...	Fair to good palish ..	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ...	Ordinary to good pale	50s a 62s 6d
Ghatti ..	Pickings to fine pale ...	20s a 55s
Kurrachee..	Good and fine pale ...	55s a 65s
	Reddish to pale selected	35s a 45s
Madras ...	Dark to fine pale ..	37s 6d a 45s
ASSAFŒTIDA ...	Clean fr to gd. almonds	40s a 80s
	Ord. stony and blocky	30s a 37s
KINO ..	Fine bright ..	£45 a £55
MYRRH, picked ..	Fair to fine pale ...	82s 6d a 90s
Aden sorts	Middling to good ..	33s a 65s
OLIBANUM, drop ..	Good to fine white ...	34s a 60s
	Middling to fair ..	20s a 31s
pickings	Low to good pale ...	11s a 12s 6d
siftings	Slightly foul to fine ...	9s 6d a 14s
INDIARUBBER, Assam .	Good to fine ...	1s 9d a 2s 4d
	Common to foul & mxd.	3d a 1s 6d
Rangoon ..	Fair to good clean ...	1s 4d a 2s 1d
Borneo ...	Common to fine ..	1s 1d a 1s 7d

	QUALITY.	QUOTATIONS.
INDIARUBBER, *(Contd).*		
Java, Sing. & Penang	Foul to good clean ..	1s 3d a 2s 3d
Mozambique	Good to fine Ball	2s 2d a 2s 6d
	Ordinary to fair Ball...	1s 2d a 2s 1¾d
	Low sandy Ball	10d a 1s 1d
	Sausage, fair to good	1s 4d a 2s 5½d
	Liver and livery Ball .	1s 3½d a 2s 1½d
Madagascar	Fr to fine pinky & white	1s 11d a 2s 5d
	Fair to good black ..	1s 3d a 1s 10d
	Niggers, low to good...	10d a 1s 5d
INDIGO, E.I. ...	Bengal--	
	Shipping mid to gd violet	4s 4d a 5s 1d
	Consuming mid. to gd.	3s 4d a 4s 1d
	Ordinary to mid. good	2s 8d a 3s 2d
	Mid. to good Kurpah...	2s a 2s 10d
	Low to ordinary ..	1s 3d a 1s 11d
	Mid. to good Madras..	1s 4d a 2s 6d
MACE Bombay, & Penang	Pale reddish to fine ..	1s 9d a 2s 9d
	Ordinary to fair ...	1s 4d a 1s 8d
	Chips and dark	1s 1d a 1s 6d
MYRABOLANES, Madras	Dark to fine pale UG .	3s 9d a 5s 6d
	Fair Coast ..	4s 9d
Bombay ..	Jubblepore ...	4s a 7s
	Bhimlies ...	4s 3d a 8s 6d
	Rhajpore, &c. ..	4s a 7s
Bengal ..	Calcutta ..	4s a 6s
NUTMEGS—	64's to 57's ...	3s a 3s 2d
Bombay & Penang	112's to 67's ..	1s 3d a 2s 11d
	160's to 130's ..	8d a 1s 2d
NUTS, ARECA ..	Ordinary to fair fresh .	12s a 14s
NUX VOMICA, Bombay	Ordinary to middling..	5s a 6s 6d
Madras	Fair to good bold fresh	7s a 7s 6d
	Small ordinary and fair	5s 6d
OIL OF ANISEED ...	Fair merchantable ..	6s 9d a 6s 10½d
CASSIA ..	According to analysis..	6s 6d a 8s
LEMONGRASS ..	Good flavour & colour..	2⅝d
NUTMEG ...	Dingy to white ..	1½d a 4d
CINNAMON ...	Ordinary to fair sweet..	4d a 1s 3d
CITRONELLE ..	Bright & good flavour	1s 1½d a 1s 2d
ORCHELLA WEED—		
Ceylon ..	Mid. to fine not woody	10s a 12s 6d
Zanzibar. ..	Picked clean flat leaf	10s a 15s
	,, wiry Mozambique	10s a 11s
PEPPER - (Black)—		
Alleppee & Tellicherry	Fair to bold heavy ..	2¾d a 3d
Singapore ..	Fair	2⅞d 2 15-16d
Acheen & W. C. Penang	Dull to fine ...	2½d a 2⅞d
PLUMBAGO, lump ..	Fair to fine bright bold	15s a 17s 6d
	Middling to good small	8s 6d a 13s
chips ..	Dull to fine bright	1s 6d a 8s 9d
dust ...	Ordinary to fine bright	2s a 6s
SAFFLOWER ...	Good to fine pinky ..	80s a 85s
	Middling to fair ..	60s a 70s
	Inferior and pickings ..	50s a 55s
SANDAL WOOD—		
Bombay, Logs	Fair to fine flavour .	£29 10s a £50
Chips	... ...	5s a £3
Madras, Logs	Fair to good flavour ..	£30 a £50
Chips	Inferior to fine ..	£4 a £8
SAPAN WOOD, Bombay	Lean to good ..	£4 a £5
,, Madras	Good average ..	£4 a £5 nom.
Manila	Rough & rooty to good	£4 10s a £5 15s
Siam	bold smooth .	£6 a £7
SEEDLAC ..	Ord. dusty to gd. soluble	70s a 80s
SENNA, Tinnevelly ...	Good to fine bold green	4d a 8d
	Fair middling medium	2½d a 4½d
	Common dark and small	1d a 2d
SHELLS, M. o'PEARL—		
Bombay ...	Bold and A's	£4 17s 6d a £5
	D's and B's	£4 10s a £5 15s
	Small	£3 15s a £4 5s
Mussel ..	Small to bold ..	20s a 50s
TAMARINDS, Calcutta .	Mid. to fine bl'k not stony	7s a 8s
Madras ...	Stony and inferior ..	4s a 6s
TORTOISESHELL—		
Zanzibar and Bombay	Small to bold dark mottle part heavy	16s a 22s 6d
TURMERIC, Bengal ...	Fair	10s a 10s 6d
Madras ..	Finger fair to fine bold bright	14s a 15s
Do.	Mixed midlng.	12s a 13s
Do.	Bulbs	8s a 9s
Cochin ...	Finger	12s
	Bulbs	7s 6d a 8s
VANILLOES—		
Mauritius and } 1sts	Gd. crysallized 3½ a 9 in.	19s 6d a 33s
Bourbon ... } 2nds	Foxy & reddish 4½ a 8 ,,	17s a 22s
Seychelles 3rds	Lean and inferior ..	12s a 17s
VERMILION ..	Fine, pure, bright ...	2s 4½d
WAX, Japan, squares	Good white hard ...	39s a 40s

THE
AGRICULTURAL MAGAZINE,
COLOMBO.

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The following pages include the Contents of the *Agricultural Magazine* or May:—

Vol. VIII.] MAY, 1897. [No. 11.

SEASON REPORTS FOR MARCH.

WESTERN PROVINCE.—Paddy. Preparations for Yala cultivation. Fruits and vegetables tend to be scarce and dear in many parts, though the supply of vegetables was fairly plentiful in Colombo. The dry weather is to some extent interfering with Yala cultivation.

Central Province.—Paddy. Maha harvest being taken in or over, Yala cultivation commenced in many places. Crop fairly good.

Northern Province.—Paddy. Kalapokam crop taken and thrashing commenced in Jaffna, reaping going on in Mannar, outturn reported good though crop somewhat damaged by flies.

Southern Province.—Paddy. Yala going on in Galle, dry weather unfavourable to growth both here and in Hambantota. Tissa fields are ripe and in blossom.

Eastern Province.—Paddy. Early Munmari harvest on, and a commencement made with Pinwari. Caterpillars have done some damage to the young paddy. Prospects are however good. Cattle murrain dying out in Batticaloa district, only cases of a mild type existing at present.

North-Western Province.—Paddy. Harvesting going on in most places and thrashing also begun; prospects generally good. Murrain in two Korales in the Kurunegala district.

North-Central Province.—Paddy. In some parts Yala ploughing and sowing is going on, while in others the last crop is not quite done with yet. Occasional cases of murrain in Nuwaragampalata.

Province of Uva.—Paddy. Preparation for Maha harvest is going on. Judging from appearances, good crops are to be expected. Some foot and mouth disease in Yatikinda.

Province of Sabaragamuwa.—Paddy. In the Ratnapura and Kegalle districts the Maha harvest is closing and Yala cultivation commencing; prospects favourable generally.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF APRIL, 1897.

1	Thursday ..	Nil	19	Monday ..	1·78
2	Friday ..	Nil	20	Tuesday ..	·81
3	Saturday ..	·17	21	Wednesday ..	·33
4	Sunday ..	·17	22	Thursday ..	·40
5	Monday ..	·17	23	Friday ..	Nil
6	Tuesday ..	·02	24	Saturday ..	Nil
7	Wednesday ..	Nil	25	Sunday ..	·47
8	Thursday ..	Nil	26	Monday ..	1·00
9	Friday ..	·29	27	Tuesday ..	·88
10	Saturday ..	Nil	28	Wednesday ..	·63
11	Sunday ..	Nil	29	Thursday ..	Nil
12	Monday ..	Nil	30	Friday ..	Ni
13	Tuesday ..	Nil	1	Saturday ..	Nil
14	Wednesday ..	Nil			
15	Thursday ..	4·70			
16	Friday ..	Nil		Total..	11·82
17	Saturday ..	Nil		Mean..	·39
18	Sunday ..	Nil			

Greatest amount of rainfall in any 24 hours on the 15th Thursday inches 4·70.

Recorded by A. R. JEREMIAH.

KAFFIR CORN.

This cereal which has lately been brought to the notice of the agricultural public in Ceylon through the columns of the local *Examiner*, and concerning which we have received many enquiries, is really an old acquaintance under a new name.

Kaffir corn, also called Guinea corn or the Indian or great millet, is botanically known as *Sorghum vulgare*, and in India as "Jowari" and "Cholum." By the last name it must be familiar to many who at first imagined tha

Kaffir corn was something new to the island, where though not systematically grown, it is found in one of its many varieties wherever there are Tamil settlements, as well as in native chena lands. Among the Sinhalese two varirties of it are known as "Idal-iringu" and "Karal-iringu." Kaffir corn has become a favourite crop in America, Africa and the Australian Colonies, but a few notes regarding the plant as grown in India, and particularly in lower India, should prove useful to our readers.

Referring to "Jowari" or "Juar" Dr. Watt says:—"It is a cereal which, after rice, is perhaps the most valuable single article of food in this country. If Bengal (the great rice-eating province) be left out of consideration, Juar takes the first place as the staple of Indian diet, and ranks a long way before wheat, barley or Indian corn;" and again, "sorghum holds in India a position very much like that of oats in Scotland."

By the natives of India sorghum is regarded as more wholesome than wheat or rice, because more easily digestible. It is ground into meal and eaten as cakes or porridge, and as parched grain is also used in various ways.

Apart from the highly nutritious nature of the grain, which compares very favourably with rice and wheat, sorghum has many good qualities which have led to its extensive cultivation. It grows on most soils, even very poor ones, though soils like those of the black cotton soil of India give the best returns. The more trouble the cultivator takes to plough deeply and work up the soil, the better outturn is he likely to get, no doubt on account of the firmer roots sent out by the plant. In India sorghum is generally grown as a mixed crop with dhall, green gram, &c. The returns of cultivated crops shows that no less than 25,000,000 acres are devoted to sorghum alone. Taking 6 maunds per acre as the average yield of grain for all India, the total comes up to 150,000,000 maunds or 5,357,142 tons, practically all of which is consumed in the Presidency.

We might write a great deal about the excellence of sorghum both as a cereal grain and as a fodder plant, and how much it is esteemed as such wherever it has been grown. We consider it eminently suited for pure cultivation or for systematic mixed cultivation in most parts of the Island on all high and dry lands unsuitable for paddy. Under irrigation it should succeed admirably in the North and North-Cent al divisions of Ceylon. It behoves Government to place facilities in the way of cultivators obtaining seeds of the best varieties of sorghum obtainable from India as well as America, and to issue a bulletin giving full instructions regarding cultivation &c., so as to encourage the regular cultivation of this valuable plant by the natives. By such measures it will be doing much towards bringing a large proportion of the high lands now lying waste and in jungle in many provinces under the plough.

By adopting the cultivation of a crop like "Kaffir corn" the people will be made less dependent on their paddy crops which in turn is so dependent on a copious water supply. Our cultivators are much in need of another cereal, and that a dry land crop practically independent of a water supply, natural or artificial. Kaffir-corn should suit them admirably and also give them better opportunities for practising improved methods of agriculture than the growing of "swamp-rice" affords them.

With the small opportunities for reaching the cultivating classes, we did what we could to bring "Kaffir-corn" to the notice of the villagers by distributing seed from the School of Agriculture some years ago. The small plantation which existed at the school then was established from seed obtained through the kindness of General La Touche at that time resident in Ceylon. There is just one instance how much the school could do if funds and the necessary "machinery" were available to induce the cultivators of Ceylon to better their position. The possibilities of agricultural improvement, we affirm, are very great in Ceylon, but the means of effecting such improvement is wanting.

OCCASIONAL NOTES.

We have had an enquiry with reference to the cultivation of mushrooms, and as the information which was supplied should be of interest to our readers, we give it below:—To grow a crop quickly, it is necessary to engender a moderately lasting artificial warmth in the material employed; yet, if possible, with moderate latent heat only. The place best adapted for their production is a rather damp godown or out-house; in this should be arranged a row of shelves at a short distance from the ground, on which the materials in which the mushrooms are to be grown should be placed to the depth of eighteen inches, and firmly beaten down. The compost best adapted for this purpose is made up as follows:—Fresh horse droppings six parts, cow dung two parts, sheep dung two parts, garden soil four parts, and fresh wood ashes one part. Before these are mixed they should be allowed to dry in the sun for two or three days to take off the excess moisture. After being mixed, and the bed made on the shelves as described above, they should be allowed to remain for five or six days till fermentation commences. As soon as a moderate heat is perceptible the spawn should be added, this is done by making holes in the surface, about 12 in. apart and 3 in. deep; in each of these a small quantity of spawn, about 2 in. square is inserted, after having first been dipped in tepid water; these should be slightly covered with the compost, and the whole beaten down firmly. After a month the beds should be covered with two inches of light rich soil, and the whole beaten down, and then well watered; it will now require no further attention, beyond occasionally watering the walls and floor of the room to promote a damp atmosphere. If properly managed the beds should commence bearing freely in about eight weeks from the time of spawning them. On the plains the best time to start a mushroom bed is from September to March; in the hills from April to October.

With reference to the introduction of new vegetables, lately discussed in connection with agricultural shows, it is interesting to find a record of the first attempt to grow potatoes

in Ceylon mentioned in Digby's Fifty Years in a Crown Colony, vol. ii., page 218; the person referred to in the extract is Mr. J. F. Lorensz (father of Mr. C. A. Lorensz) who was at the time Magistrate of Matara. "During his tenure of office under Government he made several valuable reports on the agricultural condition of that part of the Island with which he was more intimately familiar, and Bennett, in his Ceylon and its Capabilities, mentions the fact that he was the first to try the cultivation of the potato in the Island."

We are glad to hear good accounts of Jadoo from the Superintendent of the Victoria Park to whom we sent a bale of the fibre. Mr. Alwis is greatly pleased with the results which have attended its use both in germination as well as ordinary growth. Among other plants on which the fibre was trid ferns showed up well, and Jadoo is found a particularly suitable medium for orchids. Mr. Alwis used the fibre with a due proportion of soil, and we have ourselves found that it is necessary to mix the two, as when pure, Jadoo would seem to become heated at our temperature. We would again remind those to whom we have supplied samples of the fibre that it must be well comminuted before use. As a mulch for plants grown in the open we found Jadoo answer admirably during the drought that preceded the late rains.

Mr. Cyril Barber who received his training at the School of Agriculture, and has been in charge of "The Grove" Ukuwella, left Ceylon on a holiday trip to England on the 14th ultimo. He returns in six months.

Mr. F. C. Fernando (son of Mr. Austin Fernando of Colombo) who was trained at the School of Agriculture, and afterwards joined the Forestry School, has been appointed Forest Guard at Anuradhapura. Mr. Fernando had a most creditable career in both the Agricultural and Forestry Schools, and we wish him all success.

The following is a list of the Agricultural students who were given appointments in the Forest Department: Messrs. Dissanayake, Tiathonis, Kodippily, Rajapakse, Mendis, Ratnayake, Fernando, Handy, and Weerasuriya. Messrs. De Silva and Wijeyratne have also held acting appointments.

We have heard with regret of the death of Mr. J. A. Kodippily, one of the most promising of the students who were trained at the School of Agriculture. Mr. Kodippily was an officer of the Forest Department.

An Agri-Horticultural Show was held at Nuwara Eliya on the 26th and 27th of March, and, from all accounts, was a very successful exhibition. It is a matter for regret and discouragement to find that the Government could not have seen their way to allow agricultural students the modest concession of travelling free by rail to be present at the Show. The oftener agricultural Shows are held the better for the agricultural interests of the Colony, but we should wish to see a few more Shows organized solely in the interests of the native agricultural industries, on the lines of the successful Show held at Dalugama some years ago under the patronage of the late Mr. George Wall.

CHEMICAL MANURES.

Not long ago one of the local papers pointed out the evils that may be expected to arise for the want of proper checks on the sale of manures. Fertilizers are essential for successful or continued cultivation of any product whatever, hence in purchasing them we naturally wish to have some guarantee of their purity in order to avoid disappointment afterward. The composition of chemical manures may, of course, differ in different samples from natural causes, and not through the interference of man. If the fertilizing power varies with their composition then the value of manures must likewise vary, and they must not be expected to have a fixed price. No country is free from the unscrupulous dealer, who taking advantage of the good faith of his customers, sells his stuffs at a price higher than their actual value; and if this deception is possible in other forms of merchandise, much more so is it in the manure trade, the quality and value of which is not easily made out. In spite of the addition of sand, earth, coal dust and other adulterants, manures can still be made to preserve the appearance, colour, fineness and even smell of pure articles, though these mixtures have very little value. It is said that in the early days of the manure industry artificial mixtures of no value whatever were fraudulently disposed of to ignorant farmers. Such useless substances not only caused temporary disappointment and failure to those who depended upon them, but brought discredit on the real stuffs which the fraudulent mixtures were intended to represent. Those who dealt in these "frauds" did not anticipate that prejudices once formed, particularly among the less educated, are not easily eradicated, and that they (the dealers) were helping to work their own ruin as well as that of the manure trade; and if a check had not been placed on these "frauds," it is quite possible that the use of chemical fertilizers would have been entirely abandoned by this. Wherever agriculture receives the protection of Government, as it does in every civilized country, there are special laws to regulate the sale of manures. Ceylon is one of the few countries that has no Government institution, which being concerned with all matters agricultural, can offer to give a correct opinion and valuation of manures at a moderate fee. And yet we have representative members of Council calling for the abolition of the present School of Agriculture, which far from being thus threatened, should be aided and re-organized, so that it might bring forth the same excellent results that are produced by similar institutions in other countries. What could be expected from an institution which has no funds to expend in procuring draught cattle, carts, implements, manures, seeds, plants and all the necessaries for making a successful Agricultural School? The wonder is how it has done its work in the absence of all these!

But to return to my subject. The purchasers of manures should not pay for them at random—at so much per cwt., but at a certain rate per unit of the important ingredients contained in

them, in terms of guaranteed analyses which should be furnished by the vendor. The decision as to what manure suits particular crops and particular soils must rest with agricultural experts and institutions. Where fertilizers have to be mixed before use, it is important that those ingredients should not be brought together which will react upon each other so as to cause the loss of valuable manurial elements. Where stable manure is not obtainable or can only be obtained or applied at great cost, chemical fertilizers must of course be resorted to, though it is best that the two should be used together. Plants will not thrive the better for one essential element of plant food being in excess of the others but require them all in due proportion. By thoughtlessly adding a special fertilizer which might just be supplying the element which is already abundantly present in the soil, results wholly different from those expected will be got. Special manures will create a larger consummation of the elements of plant food *in the soil* and not supplied by the manure, so that the composition of the soil will be materially altered by its reserve materials being drawn upon. The effect of such special manuring is thus only of temporary benefit and ends by destroying the equilibrium, so to speak, of plant food in the soil, and so tending to interfere with the proper growth and development of the plant. To avoid such results intelligent cultivators have been making trials with different special manures, alone and mixed, but these experiments require to be carried out with the greatest possible care to be of any value. In the absence of any other agricultural establishment in Ceylon, I think the School of Agriculture (on a better site, and with average soil) should give itself up to energetically carry out experiments with different products. Given the chemical composition of the soil experimented upon, the result of these trial should provide a basis to work upon, and I am sure will be very acceptable and beneficial to the general agricultural community.

C. Z.

THE MERITS OF NATIVE DRUGS IN VETERINARY PRACTICE.

Certain drugs are commonly distinguished by the epithet "Native," and certain others "European." This is, in many instances, an arbitrary division, the crude drug being often termed "Native" and its refined preparation "European." Where the object of the refined preparation is to get rid of some deleterious substance or quality found in the crude drug, the former is, no doubt, preferable to the latter in proportion to the hurtful nature of the principle got rid of from the crude drug. In instances where a refined preparation contains the curative principle of the drug in an active and highly concentrated form and is intended to produce a prompt and sure effect, such a preparation is to be preferred especially in diseases which present urgent symptoms.

There are, however, many diseases of cattle, sheep and goats, in which it would be advantageous to use native drugs. Some vegetable drugs can be obtained almost at the very door of the villager without costing him a single cent. In a fertile tropical country like Ceylon which abounds in vegetation of a vastly diverse nature, the number of native drugs obtainable for the treatment of cattle must certainly be great. Some of these are well known and are recognized even by European Veterinary Surgeons. There are others which are not so popular, and are known only to the native *vedarala*. Some insight into native medicine with a view to find out these drugs is highly desirable. For, although native treatment as generally practised is more empirical than rational, it cannot be denied that there are several drugs used by the *vedarala* which possess valuable healing properties. *Apropos* of this fact the following remarks occur, in a description of the native medicinal plants of Ceylon sent to the Colonial and Indian Exhibition of 1886:—"It must be admitted that the materia medica of the Sinhalese will compare favourably in many respects with the Pharmacopœia of the most enlightened countries of the West. Not only is every class of medicine well represented, and supplied in profusion by the boundless prodigality of nature in Eastern tropical climes, but some of the vegetable productions are valuable enough to deserve a place in the medicinal resources of Western science, while very many can easily and usefully replace the more expensive drugs of the same class which are imported into the Colony for use in hospitals."

Economy is an important consideration in the treatment of cattle. Things have to be done on a strictly commercial basis, and the question "Will it pay?" has to be seriously considered. The cattle-owner will find it an unprofitable concern when the cost of the medicines comes to more than the value of the sick animal. Even when the medicines do not cost quite so much, expensive drugs are undesirable, as the ox requires, for each dose, at least 15 or 20 times the quantity of medicine required for a human patient.

When a number of village cattle in a herd have to be treated, as in the case of an epizootic for instance, the owner can hardly afford to pay for expensive drugs; and where the percentage of cures will be necessarily small, as in a virulent outbreak of rinderpest, treatment with expensive drugs is out of the question altogether. For the small number of recoveries, which may be attributed to the action of the medicines administered, must bear the expense of the treatment of the whole number. It has, therefore, been recommended by veterinary surgeons in India that if anything like satisfactory results are to be obtained from the treatment of rinderpest, the drugs used must be as inexpensive as possible.

Native drugs are to be prefered for the treatment of cattle not only on the score of economy, but because they are much more easily accessible in out-of-the way places. They can either be had from the jungle, or be purchased at the bazaar or boutiques. Under the class of bazaar medicines are also included mineral medicines in a more or less crude form.

Some vegetable drugs sold in the bazaar are, however, old and worthless. In the case of rare or valuable vegetable drugs that cannot be preserved raw for any length of time, it is desirable that some cheap standard preparations such as tinctures or extracts be made and preserved for use.

Speaking generally, bazaar or native drugs are more bulky and have to be given in larger quantities than European drugs possessing similar therapeutical properties. This, so far from being a disadvantage, should be considered a desirable quality in medicines intended for cattle. The capacious and complex nature of their stomach and the bulky nature of the food they eat, suggest the advisability of giving bulky medicines to cattle.

In the treatment of horses, however, native drugs are not as useful as in bovine practice. Horse owners being, as a rule, comparatively wealthy they can afford to use the more expensive European medicines, and often prefer to do so. Some veterinary surgeons consider it a retrograde step to use bazaar medicines in equine practice, and there is now a tendency to employ such new therapeutical preparations as Antipyrin and Phenacetin.

In prescribing medicines for the dog bulky and crude drugs are objectionable, and the agents used should be as palatable in order to avoid the risk of their being expelled from the stomach.

E. T. HOOLE.

Anuradhapura, 22nd March, 1897.

DR. KOCH'S INVESTIGATIONS INTO THE CAUSE OF RINDERPEST.

In continuation of Dr. Koch's Reports given in the last issue of the *Agricultural Magazine*, we give the following two further communications referring to his researches into the cause and cure of Rinderpest, being the third and fourth of his reports upon the subject. The last contains results in regard to protective inoculation of the utmost importance to stock owners. We are again indebted to the *Agricultural Journal* of Cape Colony for the text of these reports, the date of the third report being January 31st, and that of the fourth, 10th February, 1897 :—

DR. KOCH'S THIRD REPORT.

I have the honour to submit the following report upon the progress of my work on the Experimental Station at Kimberly. In my last account I had stated that I had inoculated two head of cattle with the cultivations given to me by Dr. Edington, and considered by him to contain the microbes of rinderpest. But it still remained for me to prove if the beasts operated upon were really susceptible to the disease. For this reason we inoculated them after the above mentioned period with rinderpest blood in our usual manner, with the result that on the fourth day an elevation of temperature appeared in the same way as noticed in all animals when thus inoculated. They now manifest the typical symptoms of rinderpest. There can be no doubt that these animals contracted the disease as a result of the inoculation, and I feel therefore justified in saying that Dr. Edington's microbes are not the cause of the cattle plague.

The inoculation experiments in sheep and goats were continued to the seventh generation, and in order to ascertain whether the disease produced was really rinderpest, I inocculated one heifer with the blood of an Angora of the second generation. This inoculation gave rinderpest to the animal, but though the course of the disease was rather a severe one, the beast recovered, and is now again in good health. This raised the hope that the previous passage through goats may somewhat mitigate the disease in cattle, and I therefore infected four head of cattle respectively from a goat, an Angora, a merino and a Cape sheep, after the virus had passed five times through these animals. These four animals became diseased almost simultaneously after a surprisingly short period of incubation, and three of them have succumbed after an illness of seven and eight days.

The course of the disease in the two animals infected with the blood of the merino and Cape sheep was so violent and the pathological lesions as revealed by the *postmortem* examinations of such a severe nature, that I cannot believe in any attenuation of the disease as far as sheep is concerned, but am rather inclined to think that it would be cultivated in a more virulent form.

The hope that sheep may be used for the preparation of a vaccine proved therefore illusory, but on the other hand it seems not impossible that this increased virulence produces also a higher degree of immunity that is derived from the recovery from the natural infection, and that these animals may be more valuable for immunising experiments. Rather different was the result of the other two animals, which were inoculated with blood from an Angora and from a Cape goat, for the first one showed a high temperature only during five days, scarcely any diarrhœic evacuations, and has now quite regained its health. The other one, into which I injected blood from the Cape goat, was a weak animal and did not recover ; but on making the *postmortem* examination, I found that the pathological changes in the stomach and intestines were much less marked than in those animals infected with sheep blood.

In accordance with these observations, I think it probable that the rinderpest virus, after a repeated passage through goats, becomes actually but slowly attenuated, and I propose, therefore, to continue these experiments. As none of these small ruminants succumbed to the disease, I thought it advisable to destroy an animal for internal examination.

[The postmortem examination on the merino selected showed characteristic evidences of rinderpest.]

"Many farmers are of opinion, and this I have seen myself, that these animals may graze with diseased cattle without contracting rinderpest, while on the other hand some have reported that the pest had appeared in their flocks of sheep and goats, and carried them off in large numbers, after it had already disappeared amongst the large stock. My opinion on this subject is that sheep and goats at first contract rinderpest in such a mild form that it cannot be diagnosed, but that the pest gradually becomes more virulent through being constantly propogated through these animal's systems. Then the symptoms become naturally more distinct, and in some cases the disease may even take a fatal course

For the purpose of mitigating the rinderpest virus by means of chemicals, I have been making the following experiments: I mixed rinderpest blood with glycerince in varying concentrations and also with phenol, and injected these mixtures hypodermically. As the animals treated in this

manner did not contract rinderpest as a result from the inoculation, there can be doubt that even the glycerine exercised a destructive effect upon the rinderpest virus, a circumstance which is the more remarkable as almost all infective materials, particularly the small-pox lymph, are not destroyed by it, but even preserved. After a sufficiently long time had elapsed I injected virulent rinderpest blood, and this second inoculation produced, after the usual period of incubation, genuine rinderpest. The phenol-cow, however, remained healthy, and it is not impossible that the first injection had a protective influence. I therefore repeated this experiment, and hope soon to be able to report to you on the result. Being aware that distilled water destroys the red and white blood corpuscles, and thinking that it may possibly also injure the rinderpest contagion, I diluted rinderpest blood with this liquid in a proportion of 1·20, and inoculated one beast with this material. The animal thus operated upon showed the first symptoms of rinderpest later than usual, but the course of the disease was just as violent and its termination fatal. In order to find how far the dilution of the blood can be carried without damaging its infective qualities, I diluted fresh rinderpest blood with the so-called physiological ClNa solution (0·6 per cent.) in a proportion of 1·500, and injected one cubic centimetre of this mixture. In spite of the extremely small quantity of infective material, which the animal received subcutaneously, viz., 1·500 c.cm. of blood, it contracted rinderpest after exactly the same time, and manifested the same malignant symptoms as those animals which had received 10 c.cm., a dose 5,000 times larger.

A most noteworthy experiment was the following:—I dried 10 c.cm. blood by the moderate temperature of 31 deg. C. during a period of four days, and after having dissolved it again in water I inoculated one head of cattle. This beast remained perfectly healthy, and I may therefore safely express the opinion that desiccation, even during such a short space of time, renders the rinderpest virus non-effective. This is highly important for the farming community, and I intend, therefore, making similar experiments with other media, particularly the skin and the fæces, in order to ascertain the influence which desiccation has upon them. I have already stated that blood, dried and dissolved again in the above-mentioned manner, did not produce any ill-effect upon the animal inoculated, and have now to add it also had no protective action, for the beast contracted rinderpest readily, when I subsequently inoculated it with fresh blood. Of all the animals which as yet have been suffering from rinderpest on the experimental station, four have recovered.

In my previous report I have already mentioned that they would serve for immunising experiments, but I thought it first necessary to convince myself if these animals were really perfectly safe against new infections. I therefore inoculated with rinderpest blood two "salted" animals and at the same time a fresh one. The result was, that the latter died of rinderpest, whilst the other two never evinced the least symptoms of the disease, not even the slightest rise of temperature. Having thus proved the thorough immunity of these animals, I drew from the stronger one a large quantity of blood and inoculated one beast with 100 c.cm. serum. After this animal, which on the next day was inoculated hypodermically with 1·5 c.cm of rinderpest blood, had remained well for six days, it was re-inoculated with a larger quantity of virus, viz., 1 cc.m. of rinderpest blood. Another animal was vaccinated with a mixture of both serum and blood, which previous to the operation was kept for one night in the ice-chest. This animal likewise did not show anything amiss during the next six days and was then on the seventh day inoculated with a large quantity of rinderpest blood. Both these animals withstood even the second inoculation without any injurious result. These experiments clearly demonstrate that the serum of immune animals possesses a certain protective power, but before having made further experiments it is not possible for me to say for how long a period this immunity will last and if this method can be carried out *in praxi*. I have tried to communicate rinderpest to other animals than ruminants on a somewhat extensive scale, but have not found any other species of which I could with certainty express the opinion that they are liable to the pest.

With reference to birds I may state without any hesitation that they are not susceptible. We have experimented on fowls, doves, pigeons, guinea fowls, and a crane, but with negative results. An eagle and a secretary bird I have fed for weeks on intestines taken only from rinderpest animals, but I have not observed the slightest ill-effect upon either of them. Dogs proved themselves perfectly immune. I also did not succeed in giving the pest to donkeys. Rodents, such as mice, guinea-pigs, rabbits, are also not susceptible. In pigs only it seems as if it were possible to transmit infective material successfully, but our experiments in this respect are as yet not complete.

The arrangements on the experimental station have proved themselves to be perfect, for we had no case of spontaneous infection since reporting to you last.

Another visit to several rinderpest farms in the Free State, and a small and quickly checked outbreak of rinderpest in a suburb of Kimberley afforded me again a splendid opportunity of making further observations and of procuring new material for inoculation and examination.—

DR. KOCH'S FOURTH REPORT.

I have the honour to report herewith several important facts resulting from my investigations on the Rinderpest Experimental Station.

In my last report I was already in a position to inform you that blood serum of cattle which had already recovered from rinderpest had a certain immunising effect upon the healty stock when inoculated with it.

Its protective properties, however, are not very great, for 100 c.cm. of such serum are required to protect an animal against an inoculation with a small dose of rinderpest blood. This immunity is in its nature merely a "passive" one, and will only last during a short period.

For protective inoculation on a large scale such serum is not applicable, but I succeeded in immunising within a fortnight several animals by means of a mixture of serum and virulent rinderpest blood to such a degree that they were enabled to withstand an injection of 20 ccm. rinderpest blood, a ten thousandth part of which is a fatal dose.

From this fact I judge that the immunity of

these animals is of much higher degree, and I believe it is an active immunity equal to that of a beast which has contracted rinderpest and recovered.

It is particularly important to know that only 20 ccm. of such serum are required to immunise one animal, and therefore one litre (nearly $1\frac{3}{4}$ Imperial pint) suffices for fifty head.

My further investigations concerning this *modus operandi* will aim at finding

If this immunity is obtainable in a still shorter period.

If a still smaller dose of serum will suffice and if it may be attained with but one injection.

A second and equally important fact is that one is able to immune healthy cattle with bile of such that have succumbed to rinderpest. In this case only one hypodermic injection of 10 c.cm. is sufficient.

This immunity sets in on the tenth day at latest, and is of such an extent even four weeks afterwards 40 ccm. of rinderpest blood could be injected without any injurious result. I therefore conclude that the immunity produced in such a manner is of an "active" nature.

The local result of an injection is merely a hard, somewhat painful swelling of a size of a man's fist, and which gradually disappears in the course of a few weeks, provided, however, that the bile is not in a state of decomposition as is not uncommon when an animal suffers from rinderpest. Under such circumstances an abscess may form, and which, however, does not seem to be detrimental to the process of immunisation.

Both these above-mentioned facts convince me that rinderpest can be eradicated with but little difficulty, and within a comparatively short time, by putting these methods into practice.

The method of immunising cattle with serum may be used in order to separate from infected areas those tracts of country which are still free from the scourge by means of forming a broad belt between them in which all the cattle are inoculated with the vaccin.

The protective properties of the bile will be of inestimable service in infected parts. Nearly every case of rinderpest supplies a greater or lesser quantity of vaccin for those animals which are still healthy.

I cannot but urge upon you the importance of bringing this method immediately to the notice of those cattle-owners whose animals are suffering from, or threatened with, the disease, as I am sure thousands of cattle may daily be saved by its application.

The *modus operandi* is very simple in both these methods, but it will nevertheless be desirable to teach as early as possible Veterinary Surgeons and other persons fitted for such work.

I am willing to give a course of instruction in the Experimental Station in Kimberley.

It may further be advisable to at once take into serious consideration the establishment in other parts of the country of branch stations of the Central Laboratory in Kimberley, to furnish them with the necessary equipment, and to appoint suitable persons to take charge of them.

With reference to your telegram dated 6th instant, I beg to add, that I do not consider it any more essential to experiment upon camels, as our experiments performed on cattle have been so favourable.—(Signed) R. KOCH.

POTASH IN PLANTS AND THE NEED FOR SPECIAL POTASH FERTILIZERS.

Some months ago we referred to the belief that was gaining ground in agricultural circles that the value of potash in agriculture was not correctly estimated and that much benefit was to be expected from a more extended use of kainit and other special potash fertilizers. In countries where no particular use is made of ashes, it has been thought sufficient to use them for supplying all the potash that is considered necessary for cultivated plants. The amount of potash in woodashes and other refuse substances used for suppling this ingredient is never a uniform quantity. Thus wood ashes that are supposed to contain 5 per cent of pure potash are frequently found to have not more than 2 or 3 per cent, and the difference in the potash value of wood ashes cannot be detected by its appearance.

We have just been favoured with no less than three publications with reference to the value of potash in agriculture, two referring to the results obtained in the United States, and one dealing with experiments in Britain. In the last mentioned, entitled "Potash Manuring—its value to British Agriculture," the authors, Dr. Aikman and Prof. Wright, state that the necessity for potash manuring has not, hitherto, received the recognition that has been accorded in the the case of other two important plant foods, and that they (the authors) have set themselves to examine the cause of this comparative neglect of the potash manures, and to consider how far the neglect is justifiable in view of the results of a number of recent experiments.

It has not yet been made quite clear what function potash exactly performs in the plant, but that no plant is able to grow without it has been proved again and again. Soda, which is an essential element of plant food, was at one time thought capable of replacing potash, but this was shown to be false. No other substance can replace potash which is a necessary constituent of all plants. It is a noteworthy fact that even in plants grown in the vicinity of the sea potash is more abundant than soda, although the latter salt is thirty times more abundant in sea-water than the former. The quantity of soda varies very considerably in plants according to circumstances, but nothing like the same variation is found in regard to potash. Its functions in the plant though not well understood are known to be important—more important than those of any other ash constituent except phosphoric acid. According to Liebig it plays an important part in the distribution of the carbohydrates throughout the plant. It is always to be found in the actively growing parts of vegetation, as in the growing buds and shoots, and exists in relatively large proportions in the seed. In wheat grain, for instance, potash forms 31 per cents of the ash, while in the stem it forms less than 14 per cent. In the ash of plants potash occurs chiefly in the form of phosphate, chloride, and carbonate. It is believed that

most of the potash is absorbed in the form of sulphates and phosphates, and probably also as silicate. In whatever form it is absorbed it has at any rate been proved beyond doubt to be absolutely necessary for the growth of crops.

It is a generally accepted principle of manuring that potash manures need not be applied to clay soils which are considered to always contain a sufficiencey of the constituent. Actual analyses and experiments on the field have shown, however, that this reasoning is not quite reliable Though the presence of a fair proportion of clay in a soil may be accepted as a guarantee of the presence of potash, it is not always so. There are soils containing much clay that do not contain much potash. It has been found by experiments that potash manures produced a large increase of crop, though the field to which the manures were applied was of a stiff and clayey nature, such as would be described as a stiff clay loam.

Again, potash may be present without being effective. The ordinary methods of chemical analysis can determine the amount of potash in the soil, but of that amount it may happen that the greater propotion exists in a condition in which crops are unable to make use of it. The ordinary solvent agencies in the soil have but a limited power of dissolving insoluble compounds in which it chiefly exists, and that too only on the limited region of the soil particles with which they come into the most intimate contact. Hence a soil may be rich in potash, and yet that potash, or the greater part of it, may be quite unavailable, or be available in quite insufficient quantity for the needs of the growing crop which might, therefore, largely benefit by the application of an artificial potash manure. Before it can be safely concluded, from its composition only, that a soil will not be benefited by potash manures, it is necessary to know not only that the soil contains much potash, but that it contains it in a form in which it is readily available for the use of plants.

Some soils contain as much as 3 or 4 per cent and more of potash, while the soils which are generally poorest in this constituent are sandy and peaty soils, and these latter are generally found to produce a considerate increase of crop by the use of potash manures.

The variation in the amount of potash soluble in water in a soil usually ranges between a thousandth and a hundreth per cent. The remainder is usually present as hard insoluble compounds which are not available for the plant's needs, and only very gradually, with the lapse of time, become so. There are, however, certain compounds which, while not soluble in water, are believed to be more or less available for the plant. The water, in the soil by virtue of carbonic acid and certain other organic acids which are dissolved in it, has a greater solvent power on mineral substances than pure water, and this solvent power is further aided by the acid nature of the juices in plant roots. A striking instance of the power of roots to dissolve insoluble substances can be seen in nature by tracing the roots of such plants as ferns that appear to cling to the bare surface of rocks.

Dr. Bernard Dyer, who has been endeavoring to estimate the dissolving power of soil water and plant roots on mineral substances such as potash, has come to the conclusion after a large number of determinations, that the sap acidity of roots is equal to a one per cent solution of citric acid. Testing certain soils with a solution of this strength he has found that the amount of potash available is very much greater than that indicated by testing it in pure water. Thus in two soils, in which the total amount of potash present was about 1½ per cent, the available potash was four thousandth and three hundredth of a per cent respectively. This is much more than could be dissolved by pure water, yet this result also shows that only a very small proportion of the total potash in the soil may be regarded as immediately available to plants. Of this small proportion available, it must be noted also that a loss by drainage of the soluble potash in the soil is constantly going on to a greater or less extent.

In our next issue we shall continue our notice of the interesting pamphlet referred to by Dr. Aikman and Prof. Wright, so as to place the latest informations with reference to potash in soils and potash manures at the disposal of our readers.

RUBBER GROWING.

The Australian Tropiculturist for March has a special article on this subject, referring to the industry as a new fortune-promising one and calling upon the Government to plant up all available costal areas, since "flat alluvial river lands are regarded as the best soil for Indiarubber trees."

Regarding Castilloa, it is said that the tree thrives best in moist but not marshy forests, on a warm sandy clay."

"For each plant a hole should be dug 3 ft. in diameter, and 1 ft. deep, and filled with fine loamy soil to which a little sand has been added. The mixture should be well trodden down and watered night and morning for two days, when it is ready for the young *Castilloa*, which must be placed in its new bed at exactly the same depth as in the nursery; if it is weak, a stake support is very desirable."

To this might be added that the young plants should be at least 15 feet apart. But it cannot be reiterated too often that the locality must be a sheltered one.

A curious fact about the *Castilloa* is that frequently natural ropes of rubber are found hanging from the tree formed by the tapping of the bark by wood-peckers, the exudation of the creamy sap that coagulates as it trickles slowly down.

The method of harvesting the sap is as follows:—Immediately below the first branch a horizontal canal is cut, V shaped; from the point of the V downwards a perpendicular canal is cut till it joins another horizontal V, and so on down to the ground. The sap is guided into a receiver, and the water in it evaporates. Evaporation may be assisted by artificial heat, and coagulation is forced by an agent. Then Indiarubber is formed. The canals should be plastered with mud or clay, to protect the life of the tree.

The quantity of rubber produced from the sap depends largely on the coagulating agent used. Sixty per cent. *ought* to be converted into rubber. An ounce of alum in a pint of water (not Imperial pint) is a good agent; a weak alcoholic solution is better, because speedier.

The commercial profits in the rubber trade are so enormous as almost to challenge belief. The traders who deal with the natives frequently purchase for mere civilised trumperies hundreds of pounds' worth of rubber; these sell at the last-named price to the merchants; what the merchants make would be difficult to estimate. So long as this system is open to the enterprise of the New Guinea pioneers trading in the interest of Melbourne and Sydney syndicates, *they* are not likely to trouble to preserve the trees!

As one object of this article is to show that rubber-cultivation may be more profitable in the long run than rubber-piracy, it is necessary to quote figures as to profits made by such cultivators. Here, unfortunately, one has to go to the other side of the world for startlers. A typical estimate of a 500-acre rubber farm in Nicaragua made the eighth year's profits £44,337 10s! "And the yield increases every year, with no outlay except for weeding and harvesting."

This calculation could scarcely apply to Queensland, because the cost of even kanaka labor would be more than that of Nicaraguan. But in a plantation of trees planted 15 ft. apart, coffee, sugarcane, and other shade-loving plants, yielding yearly crops, might be sown.

The life of a rubber-tree has never been exactly stated, but the New York *World* mentioned in 1892:—

"Three young trees transplanted from the forest to a cultivated field in Soconusco, Mexico, are now said to be seven feet in diameter, and have yielded rubber for more than 35 years; the present product averaging more than 50 lb. of gum per year."

The average increase is estimated to be 1 lb. of rubber for each year of the tree's life, up to a certain age. Trees tapped in the wet season are said to yield five times as much milk as when tapped in the dry.

GENERAL ITEMS.

A correspondent writing on scour in calves to an Australian contemporary gives the following remedy:—"Take a two quart pot and fill it loosely with young gum leaves; pour in as much water as it will hold and boil for a quarter of an hour. Mix a tablespoonful of flour and one teaspoonful salt smoothly in as much of the infusion (when cool) as will half fill a lemonade bottle, and give it to the calf twice a day, a little less or more according to its age. I have never lost a calf under this treatment, though it may have to be continued several days or a week."

In a review of the agricultural progress of India in the *Indian Agriculturist*, we read that "The most important matter is the proper education of the agriculturist, for the Government of India still hold to the opinion expressed in the opening resolution of 1881, and again in the resolutions convening the Conferences of 1890, 1893, and 1895-96, that no important reforms can be safely or widely introduced into the agricultural system without the general co-operation of the farming classes, from whom intelligent and willing aid cannot be expected 'until their education has been so directed as to enable them to appreciate, and where expedient to adopt, the results obtained by the systematic and continuous inquiries of experts.' This view has been strongly confirmed by the various Conferences which have recently discussed the question, and has been supported by all local governments and administrations."

In Agricultural Ledger No. 23 on iron ploughs we read that in a great many parts of the Madras Presidency, during the last 10 or 15 years, iron ploughs have come into use and are now generally preferred to the heavy country ploughs for bringing waste and under cultivation, as well as for clearing cultivated land of deep-rooted grasses at intervals of three years and upwards.

All ryots who have tried them are of opinion that with iron ploughs a given area can be ploughed much sooner than with the heavy wooden implement, while the cost of thoroughly clearing land with hand implements is R15 or R20 per acre, the cost by means of the iron plough is not more than one-fifth as much. Experienced ryots say that the productiveness of land is not materially increased by deep tillage with iron ploughs, in the first year after the ploughing, but that it is in subsequent years. Iron ploughs are, therefore, highly appreciated for the comparative cheapness and rapidity of their work, and are often hired by the ryot at about 6 annas a day, or from R10 to R15 if hired by the month.... Many a man who has no land whatever purchases an iron plough simply with the intention of making a profit by hiring it to the ryots.

We have to acknowledge the receipt of the following:—Agricultural Journal of the Cape of Good Hope; Sugar Journal and Tropical Cultivator (Queensland); Agricultural Gazette of New South Wales; The Central African Planter; Australian Tropiculturist (Brisbane); Indian Agriculturist; Indian Agricultural Ledgers Nos. 39, 40 and 41; The Rural Californian; Agricultural Gazette (Barbadoes); The Ceylon Review; St. Thomas' College Magazine; Royal College Magazine; Our Boys; Report of the Department of Land Records, Agriculture, Madras; The Scottish Farmer; Journal of the Royal Agricultural Society, England; Proceedings of the Royal Physical Society; Proceeding of the Highland and Agricultural Society of Scotland.

We are in receipt of a copy of an elementary work on English Grammar, edited by Mr. L. E. Blazé, B.A. The little work supplies a decided want, and does credit to the author. We want more of these "indigenous" handbooks, written by competent authorities, and specially adapted to the requirements of the Ceylonese youth.